

FINAL

**2013 SEMI-ANNUAL GROUNDWATER
MONITORING REPORT**

**Joliet Army Ammunition Plant
Will County, Illinois**

Submitted to:



**US Army Contracting Agency
APG Directorate of Contracting – AEC Team
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ACRONYMS AND ABBREVIATIONS

ACSIM	Assistant Chief of Staff for Installation Management
Army	United States Army
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
cm/sec	centimeters per second
COC	contaminant of concern
CSM	conceptual site model
1,1-DCA	1,1-dichloroethane
1,3-DNB	1,3-dinitrobenzene
2,4-DNT	2,4-dinitrotoluene
2,6-DNT	2,6-dinitrotoluene
2-A-4,6-DNT	2-amino-4,6-dinitrotoluene
4-A-2,6-DNT	4-amino-2,6-dinitrotoluene
DO	dissolved oxygen
DQER	Data Quality Evaluation Report
F	estimated concentration
ft	foot/feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
FSP	Field Sampling Plan
GMZ	Groundwater Management Zone
GOU	Groundwater Operable Unit
GRU	Groundwater Remediation Unit
HMX	High Melting-point Explosive
in.	inch
IAC	Illinois Administrative Code
IC	institutional control
ID/IQ	Indefinite Delivery/Indefinite Quantity

IEPA	Illinois Environmental Protection Agency
JOAAP	Joliet Army Ammunition Plant
LAP	Load-Assemble-Package area
LTM	long-term monitoring
LTM Plan	Final Long-term Monitoring Plan for Environmental Remediation Services
MDL	method detection limit
MFG	manufacturing area
mg/L	milligrams per liter
ml/min	milliliters per minute
MNA	monitored natural attenuation
MRL	method reporting limit
MWH	MWH Americas, Inc.
MS/MSD	matrix spike/matrix spike duplicate
NB	nitrobenzene
ND	not detected
NPL	National Priority List
2-NT	2-nitrotoluene
3-NT	3-nitrotoluene
4-NT	4-nitrotoluene
OD	outside diameter
ORP	oxidation-reduction potential
OU	operable unit
PCE	tetrachloroethene
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
RA	remedial action
RDX	Royal Demolition Explosive
RG	Remedial Goal
RI	Remedial Investigation
ROD	Record of Decision
SOU	Soil Operable Unit

SpC	specific conductivity
SVOC	semi-volatile organic compound
TAL	target analyte list
1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene
TNB	1,3,5-trinitrobenzene
TNT	2,4,6-trinitrotoluene
TolTest	TolTest, Inc.
µg/L	micrograms per liter
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

This Semi-annual Groundwater Monitoring Report (Report) has been prepared by TolTest, Inc. (TolTest) in conjunction with teaming partner MWH Americas, Inc. (MWH) for environmental remediation services at the former Joliet Army Ammunition Plant (JOAAP) on behalf of the United States Army Environmental Command (USAEC) Assistant Chief of Staff for Installation Management (ACSIM) under Indefinite Delivery/Indefinite Quantity (ID/IQ) Contract No. W91ZLK-05-D0012, Delivery Order 0001.

This Report presents the groundwater quality data for the long-term monitoring (LTM) program of the Groundwater Operable Unit (GOU) and landfill inspection documentation for January and April inspections for the Soil Operable Unit (SOU) at JOAAP in response to the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas* (U.S. Army, 1998) (ROD) for the JOAAP facility. The remedy that was selected for the GOU Sites at JOAAP was monitored natural attenuation (MNA). As a function of the MNA remedy for the Groundwater Remedial Units (GRUs), LTM is required. This requirement is intended to satisfy three primary objectives:

1. Monitor contaminant concentration reductions and plume migration;
2. Verify containment of contaminant concentrations greater than Remedial Goals (RGs) within the Groundwater Management Zones (GMZs); and
3. Evaluate the effectiveness of SOU remedial actions (RAs) and MNA for the GOU remedy.

These objectives are being met through implementation of the LTM program.

In addition to the GOU, the SOU remedial actions included the construction of three landfills at Sites L3, M11, and M13. Landfill inspections are required quarterly to determine if the remedy continues to function as designed. Post-closure inspection reports for January and April for landfills L3, M11, and M13 are included in Appendix A.

The objective of this report is to provide a data submittal of the groundwater quality sampling results from winter and spring 2013 and provide documentation of landfill inspections. Additionally, water table and potentiometric surface maps for the January quarterly (Landfill M13) and April semi-annual sampling event are included.

1.1 FACILITY DESCRIPTION AND BACKGROUND

Joliet Army Ammunition Plant was a former United States Army (Army) munitions production facility located on approximately 36 square miles (23,542 acres) of land in Will County, Illinois (Figure 1-1). The former facility is located approximately 60 miles southwest of Chicago and 14 miles south of Joliet, Illinois. As shown on the Groundwater Studies Area Map and Landfill Sites (Figure 1-2), the JOAAP property is divided into two

main functional areas: the Manufacturing (MFG) Area west of Route 53, and the Load-Assemble-Package (LAP) Area east of Route 53. The facility has been described in detail in Section 1.1 of the *Final Long-term Monitoring Plan for Environmental Remediation Services* (LTM Plan [TolTest/MWH, 2010]).

The MFG Area, covering approximately 14 square miles (9,159 acres), is where the chemical constituents of munitions, propellants, and explosives were produced. The production facilities were generally located in the northern half of the MFG Area. In the southern half of the MFG Area, there was an extensive explosives storage facility. The LAP Area, covering approximately 22 square miles (14,383 acres), is where munitions were loaded, assembled, and packaged for shipping. The LAP Area contained munitions filling and assembly lines, storage areas, and a demilitarization area.

Joliet Army Ammunition Plant was constructed during World War II. The production output varied with the demand for munitions. Although the plant was used extensively during World War II, all production of explosives halted in 1945. At that time, sulfuric acid and ammonium nitrate plants were leased out and the remaining production facilities were put in layaway status. The installation was reactivated during the Korean War and again during the Vietnam War. Production gradually decreased until it was stopped completely in 1977.

Hazardous wastes were generated and released into the environment through several pathways. Process waters used in the production and handling of 2,4,6-trinitrotoluene (TNT) and other compounds were discharged into drainage systems. Buildings and equipment were periodically washed to remove explosive residues and the wastewater would be allowed to leach into the ground or flow into the local surface water and creeks. Later, process water incineration or industrial wastewater treatment produced ash or explosives residue that accumulated over time. Ash from the incineration of production by-products was stored in landfills on-site. Equipment and demolition materials were flashed (burned) to remove residues. Fire training areas, used to keep fire and safety personnel suitably prepared, introduced contaminants to the soil and groundwater. Leaks and spills occasionally occurred in the storage and handling of oils and other liquids. Wastes and unusable explosives and munitions were burned or detonated. In addition, munitions were tested, leaving some residuals in the soil at the test sites. Vehicle and equipment maintenance, transformer leaks, and the handling of pesticides introduced further contamination to the soil.

Wastes generated during production activities resulted in environmental contamination at various sites around JOAAP. Because of this contamination, the United States Environmental Protection Agency (USEPA) placed the MFG Area on the National Priority List (NPL) on July 21, 1987 and the LAP Area on the NPL on March 31, 1989.

The contaminated media identified at JOAAP were divided into two operable units (OUs) to aid in the development and evaluation of remedies. The SOU consists of sites where contaminated soils, sediments, and debris were identified. The GOU consists of sites

where contaminated groundwater was identified. Surface water was determined to pose no risk to health and the environment and therefore is not addressed further as a contaminated media. However, surface water discharge is a major component of the shallow groundwater system and localized detections of explosives may occur near contaminated groundwater sites. For this reason, surface water is relevant to the GOU.

Substantial land at JOAAP is not contaminated. Transfer activities for that land have occurred and some are still underway. After remaining potential hazards to human health and the environment are addressed under the SOU and these properties are found suitable for transfer under Public Law 104-106 and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Army will prepare documentation for transfer.

The Illinois Land Conservation Act of 1995, PL 104-106, Div. B, Title 2901-2932, February 10, 1996, states that the Army will transfer JOAAP land to various federal, local, and state jurisdictions. Transfer of land is occurring incrementally as it is remediated and is deemed appropriate. As of the production of this report, the distribution of JOAAP land through these incremental transfers is approximately 17,726 acres to the United States Department of Agriculture (USDA) for establishing the Midewin National Tallgrass Prairie; 982 acres to the Department of Veterans Affairs to establish a Veterans Cemetery; 455 acres to Will County, Illinois to establish the Will County Landfill; and 2,885 acres to the State of Illinois to establish two industrial parks.

Where groundwater contamination is present within areas to be transferred, the Army has included institutional controls (ICs) in the transfer documents to prevent exposure to contaminants, limit groundwater pumping, and prevent manipulation of the natural groundwater flow patterns through any means. These controls will help to limit the spread of the remaining contamination in groundwater and will remain in effect with the land until removed by mutual agreement of the Army, USEPA, Illinois Environmental Protection Agency (IEPA), and the current landowner.

1.2 NATURAL ATTENUATION MECHANISMS

The selected remedial action for the GOU is remediation by natural attenuation. A detailed overview of the physical, chemical, and biological criteria, which are most directly linked to natural attenuation mechanisms and the site-specific criteria used to evaluate natural attenuation at JOAAP is provided in the LTM Plan and annual groundwater monitoring reports where natural attenuation is evaluated and reported.

1.3 RECORD OF DECISION REQUIREMENTS

The ROD specified general groundwater monitoring requirements. These requirements were based on information presented in the Remedial Investigation (RI) Report and did not

have the additional information provided by the predesign investigation completed in 1998 or subsequent remedial actions completed at JOAAP. As such, the Army applied subsequent site data as well as historic data to arrive at site-specific LTM locations and analytes, which were included in the LTM Plan.

Based on the objectives presented in Section 1.2 of the LTM Plan and as an extension of the ROD, several types of monitoring are required for each site. These include:

- Collection of groundwater samples to evaluate contaminant concentrations;
- Collection of surface water samples where groundwater discharges to surface features to evaluate surface water contaminant concentrations;
- Collection of depth to water measurements to evaluate groundwater flow;
- Documentation and evaluation of source removal or surface disturbing activities;
- Documentation of changes in surface water features, impoundments, or conveyances; and
- Evaluation of evidence concerning illicit water withdrawal affecting contaminant migration.

1.4 LONG-TERM MONITORING PLAN

Monitoring activities are required pursuant to the decision documents developed for the various contaminated sites found at JOAAP. The LTM Plan was produced to present LTM activities for the GOU and required SOU maintenance activities. The LTM Plan includes activities associated with long-term maintenance of the remedies selected for JOAAP. The objective of the LTM Plan was to provide a sufficiently detailed description of the monitoring strategy and process and to establish realistic expectations for execution of the program on the part of all stakeholders. With respect to the latter objective, it is the intent of the plan to establish both the actions to be taken in the event of various sampling outcomes and the set of conditions required to reduce and eventually discontinue LTM efforts where practicable. As such, the LTM Plan includes sample collection and analysis of ground and surface water, surveillance of cap maintenance and access restrictions at landfills, and surveillance of land use restrictions and other ICs implemented on an installation-wide basis.

Section 3.1 of the LTM Plan summarizes the GMZs and monitoring well designations and discusses the decision tree for interpretation of groundwater quality results and the logic for optimizing site monitoring programs. Section 3.2 of the LTM Plan discusses IC monitoring required as part of the MNA remedy.

The LTM program is presented in Section 4.0 of the LTM Plan which includes a discussion of site-specific monitoring programs for the GMZs and landfills, monitoring well installations, abandonments, monitoring schedules, requirements for IC monitoring, and reporting schedules. Tables A1-1 through A1-9 of Appendix A (Field Sampling Plan, [FSP]) of the LTM Plan provide specific information about the monitoring requirements at

each site. However, it is expressly presented that modifications to the LTM program will likely occur with changing conditions. Therefore, the LTM Plan tables were consolidated into a single table that is continually updated based on groundwater monitoring results and periodic reviews. The sampling completed for spring 2013 is presented as Table 1-1 which summarizes the monitoring locations and requisite analyses for those monitoring locations.

The LTM Plan provides a site-specific evaluation of the natural attenuation remedial option that is being applied to all GOU sites. The purpose of the LTM Plan is to:

- describe the process by which data will be collected and analyzed,
- determine if remedies in place at JOAAP are protective of human health and the environment,
- describe the nature of monitoring results that, if observed, would indicate further action be taken because the remedy does not appear to be sufficiently protective,
- prescribe the conditions under which certain monitoring activities may be terminated, and
- provide a detailed description of activities to monitor the GOU natural attenuation RA.

Section 5 of the LTM Plan describes reporting requirements for LTM activities. The LTM Plan reporting schedule requires the submittal of a semi-annual report, which is a presentation of the results of the winter and spring sampling events with minimal analysis, and an annual report that presents the results of the summer and fall sampling event with detailed evaluation of trends in the groundwater data. The semi-annual sampling schedule identified in the LTM Plan indicates that the sampling periods will generally be April and October of each year at all sites except Landfill M13, which is sampled quarterly, generally in January, April, July, and October of each year. In 2013, the winter quarterly sampling event at Landfill M13 was conducted during January and the spring semi-annual sampling event was conducted in April. Annual groundwater monitoring reports are the venue in which data are analyzed and proposed changes to the LTM Plan are presented. Acceptance of the final annual groundwater monitoring report by regulators will constitute approval of recommended changes in the monitoring program.

The LTM Plan also provides for a CERCLA five-year review of the GOU natural attenuation remedy and SOU remedy, as required by the ROD. Natural attenuation data were collected during the fall 2003 sampling event to facilitate the first five-year review. The First Five-Year Review Report was completed following the fall 2003 sampling event. The Final Second Five-Year Review Reports for the GOU and SOU were submitted in August 2009. Subsequent five-year reviews will be completed to evaluate the effectiveness of the GOU and SOU remedies and, if necessary, provide recommendations to modify the remedy to make it more effective. The Third Five-Year Review Report, due in May 2014, will have the GOU and SOU remedy protectiveness evaluated in one consolidated document. Furthermore, if the third five-year review suggests that natural attenuation may not result in reasonable agreement with ROD requirements, evaluation of available contingency remedies will be presented as part of the five-year review process.

2.0 SITE ACTIVITIES

This section provides a summary of the LTM Plan requirements, the groundwater monitoring activities at each of the GOU's, and the SOU RA landfill inspections.

2.1 GROUNDWATER MONITORING

This section provides a summary of the field activities undertaken to perform winter and spring quarterly groundwater monitoring at Landfill M13, and spring semi-annual monitoring at the remaining GOU and SOU sites. Site L2 was not sampled in spring 2013 as recommended in the 2009 Annual Report. Site L14 was not sampled in spring 2013 as recommended in the 2010 Semi-annual Report. Landfill M11 was not sampled in spring 2013 as recommended in the 2011 Annual Report.

The measurement of water levels at the monitoring wells was conducted using an electronic water level indicator. Depth to water was measured from a datum mark on the top of the well casing at each monitoring well. All measurements were to an accuracy of +/- 0.01 foot (ft).

In accordance with the standard operating procedure for low-flow sampling, monitoring wells were purged and sampled using low-flow sampling techniques at a flow rate of approximately 100 to 250 milliliters per minute (ml/min). Dedicated ¼-inch (in.) outside diameter (OD) Teflon™ lined polyethylene tubing is installed in each monitoring well. The Teflon™ lined polyethylene tubing is connected with dedicated silicon tubing to a variable speed peristaltic pump. During purging, the pump discharge tube is attached to a multi-probe water quality meter equipped with a flow-through cell. The water quality meter is equipped with probes for measuring field parameters including temperature, pH, specific conductivity (SpC), oxidation/reduction potential (ORP), dissolved oxygen (DO), and turbidity. The water quality meters were calibrated daily in accordance with Appendix A (FSP) of the LTM Plan and the manufacturer's instructions.

Measurements of field parameters were taken at 2-minute intervals and recorded on Groundwater/Surface Water Sampling Forms. Final field purge parameters are summarized in Table 2-1. Purging of each monitoring well was considered complete when field parameters stabilized over three successive measurements to within 10%, per the LTM Plan. Upon stabilization of the field parameters, the required samples were collected from the discharge tube of the pump into laboratory-supplied containers after disconnecting the flow-thru cell.

Samples were collected in laboratory supplied preserved containers for explosive compounds in unpreserved one-liter amber glass bottles; target analyte list (TAL) metals in one-liter, nitric acid preserved polyethylene bottles; inorganic parameters nitrate and sulfate in 250 milliliter unpreserved polyethylene bottles; volatile organic compounds (VOCs) in 40 milliliter hydrochloric acid preserved glass vials; and semi-volatile organic compounds (SVOCs) in unpreserved one-liter amber glass bottles. Samples were analyzed

by Test America of Arvada, Colorado in accordance with Appendix B – Quality Assurance Project Plan (QAPP) of the LTM Plan. Samples collected for inorganic parameters TAL metals, nitrate, and sulfate were field filtered using high capacity 0.45-micron cartridge filters.

2.1.1 January 2013 Monitoring

TolTest/MWH measured water levels at eleven monitoring wells and sampled six monitoring wells as summarized in Table 1-1. The first quarterly monitoring event in 2013 at Landfill M13 was conducted on 30 and 31 January 2013.

The gauging of the monitoring well water levels was accomplished using techniques discussed in Section 2.1. Groundwater elevations are summarized in Table 2-2 for the MFG.

Groundwater monitoring was conducted in accordance with Appendix A (FSP) of the LTM Plan, as described above.

Blind duplicate samples were collected at a rate of 10% (1 per 10) for each analyte sample total. Blind duplicate M13-MW999 was collected at parent location M13-MW806 at Landfill M13 for VOCs, SVOCs, explosives, TAL metals, nitrate, and sulfate.

Matrix spike/matrix spike duplicate (MS/MSD) samples are collected at a rate of 5% (1 per 20) for each analyte sample total.

Third-party Level III data validation was completed for all groundwater and surface water samples collected. Based on the results of the validation, a data usability report was completed and is included in Appendix B1 and the Data Quality Evaluation Reports (DQER) are included in Appendix B2 of this report.

2.1.2 April 2013 Monitoring

TolTest/MWH measured water levels or surveyed a total of 139 monitoring wells and surface water locations at JOAAP. A total of 30 monitoring wells and 1 surface water location were sampled at the MFG (Sites M1, M6, M7, M8, other areas, and Landfill M13) and 10 monitoring wells and 5 surface water locations were sampled at the LAP Area (Sites L1 and L3/Landfill L3) as summarized in Table 1-1. Field activities were conducted from 08 April through 16 April 2013 in accordance with Appendix A (FSP) of the LTM Plan.

The gauging of the monitoring well water levels was accomplished using techniques discussed in Section 2.1. Surface water elevations are determined by referencing to the known elevations of nearby benchmarks using a level and rod and from marks on existing structures (bridges) for some locations; where at others a direct measurement with a water level indicator was completed. All gauging and surveying measurements were taken to an accuracy of +/- 0.01 ft. All surface water locations contained water during gauging and

sampling activities. Water level measurements and surveying activities for each site were generally completed within a 24-hour period.

Monitoring well information for the MFG area monitoring wells and water levels measured in January and April 2013 are summarized in Table 2-2. Monitoring well information for the LAP area monitoring wells and water levels at monitoring wells measured in April 2013 are summarized in Table 2-3. Surface water elevations are summarized in Table 2-4. Groundwater and surface water hydraulics are discussed in Section 3 on a site by site basis.

Groundwater sampling was conducted in accordance with Appendix A (FSP) of the LTM Plan, as described above. A water quality meter was used to determine surface water measurements for temperature, pH, SpC, ORP, DO, and turbidity. However, parameters were not required to stabilize due to the flowing nature of the surface water. Surface water samples were collected by directly immersing the sample container into the surface water body so as to fill the bottle if filtration was not required. If filtration was required, a peristaltic pump with tubing placed directly in the surface water body was used for sample collection.

Blind duplicate samples are collected at a rate of 10% for each analyte sample total. The majority of the duplicate samples were collected from monitoring wells that previously had detections. Duplicate samples were collected from six monitoring wells in the LAP and MFG areas in April 2013. Details concerning field duplicates for April 2013 are as follows:

Duplicate Sample Number	Monitoring Point Sampled	Site	Sample Date	Analyte
MW996	MW630	L3	4/16/2013	Metals
MW996	MW633	L3	4/15/2013	Explosives
MW997	MW641	M1	4/12/2013	Explosives
MW998	MW212R	M6	4/11/2013	Explosives
MW999	MW173	L1	4/13/2013	Explosives
MW999	MW362	M13	4/9/2013	VOCs, SVOCs, Explosives, TAL Metals, Nitrate, and Sulfate

Matrix spike/matrix spike duplicate samples are collected at a rate of 5% for each analyte sample total.

Third-party Level III data validation was completed for all groundwater and surface water samples collected. Based on the results of the validation, a data usability report was completed and is included in Appendix B1. The DQER are included in Appendix B2 of this report.

Repair activities completed during the April 2013 sampling activities included the following:

- Repaired the hinge on L3 monitoring well MW411
- A weep hole was drilled in the protective casing for Site M5 monitoring well MW156R
- A weep hole was drilled in the protective casing for Site M6 monitoring well MW662
- A weep hole was drilled in the protective casing for Site M6 monitoring well MW663
- A weep hole was drilled in the protective casing for Site M8 monitoring well MW121

Additional required repair activities identified include repairing the hinge on Other Areas monitoring well MW116.

2.2 LANDFILL INSPECTIONS

Post-closure monitoring requirements for Landfills L3, L11, and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for 15 years at Landfill M13 and 30 years at Landfills L3 and M11. The LTM Plan states that the L3 Landfill cover will be inspected quarterly, the M11 Landfill cover will be inspected quarterly for the first five years and annually for 25 years, and the M13 Landfill cover will be inspected quarterly. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed;
- Keep survey points protected and visible to facilitate identification in the future.
- At M13 ensure the fence and signage installed to restrict site access remain in place and serviceable; and
- At M13 certify that institutional controls remain in place.

According to IAC and the Final LTM Plan, Landfill L3, M11, and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover;
- Erosion features;
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring; and
- Debris or blockage of drainage structure.

In addition, land use restrictions have been imposed across the area within the fence. Annual certification is required to document that none of the following are occurring within the fence:

- Development
- Intrusive work
- Excavation that could mobilize contaminants of concern (COCs)
- Alteration of surface water flow
- Vehicle use other than that associated with maintenance of the cover/cap.

Landfill inspections were conducted on a quarterly basis at landfills L3, M11, and M13 starting in October 2008 in accordance with the LTM Plan. Landfill inspection reports for January and April 2013 are included as Appendices A1 and A2, respectively.

2.2.1 January 2013 Landfill Inspections

Site inspections of Landfills L3, M11, and M13 were conducted on 31 January 2013 in accordance with the LTM Plan. No loss of vegetative cover at any of the three landfills was observed, which was a concern due to the previous year's record drought. The rip rap along Prairie Creek at Site L3 appears to be stable and does not appear to be failing. Woody growth is present within the rip rap along Prairie creek which needs to be removed. The gas vents at M11 and M13 appear to be in working condition and don't require maintenance. The ditch directly south of Landfill M13 is collecting surface water due to the flow being impeded. The January Inspection Report is included in Appendix A1.

2.2.2 April 2013 Landfill Inspections

Site inspections of Landfills L3, M11, and M13 were conducted on 10 April 2013 in accordance with the LTM Plan. The vegetative cover is green and no dead areas were encountered during the inspection. Although small areas of the synthetic cap at L3 are exposed due to displacement of the rip rap, the liner is only visible in the sloped, rip rap armoring area, not over any place at the landfill at L3. The L3 landfill appears to be stable and does not appear to be failing. The remaining rip rap also appears to be stable. Woody growth continues to be a problem within the riprap located along Prairie Creek. The gas vents at M11 and M13 appear to be in working condition. Several of the connecting bolts on the vents were tightened. The ditch directly south of Landfill M13 is collecting surface water due to the flow being impeded. The April Inspection Report is included in Appendix A2.

2.3 INSTITUTIONAL CONTROLS MONITORING

The remedies selected for all areas of JOAAP do not allow unrestricted use of the property or underlying groundwater. Restrictions on use of groundwater are limited to the GMZs and annual certification that the restrictions are being maintained for each GMZ is required.

Land use restrictions over and above those associated with groundwater use apply wherever waste or contamination has been left in place at levels that pose an unacceptable risk without some form of ICs. Some of those areas include the three landfills (L3, M11, and M13) with associated restrictions with annual certification. For all other areas with institutional controls there is a need for similar annual certification that the deed restrictions remain in place and are effective. Annual certifications are completed separate from this report. However, during groundwater monitoring and landfill inspections conducted quarterly at Landfill M13 and site-wide sampling conducted semi-annually in 2013, there were no observations of intrusive soil activities, construction, or improper use of groundwater which would affect the GOU or SOU remedies.

3.0 RESULTS AND RECOMMENDATIONS

Groundwater management zones are three-dimensional areas containing groundwater being managed to mitigate impairment according to IAC. The GMZs comprise both the glacial drift and shallow bedrock (Silurian Dolomite) aquifers and are bounded at depth by a confining shale unit (Maquoketa Shale). The GMZs were established with acceptance of the ROD. Any future modification of GMZ boundaries will have to be mutually agreed upon between the Army, USEPA, and IEPA. Groundwater monitoring wells and surface water collection points located inside and/or near the borders provide monitoring points for contaminant plumes. Site-specific plans for GMZs for GOU sites are discussed in Sections 3.1 through 3.5.

Groundwater and surface water samples collected in January and April 2013 were analyzed for one or more of the following parameters: explosive compounds, TAL metals, indicator parameters (nitrate and sulfate), VOCs, and SVOCs. Analytical results from January and April 2013 sampling events for explosive compounds, TAL metals, indicator parameters (nitrate and sulfate), VOCs, and SVOCs are summarized in Tables 3-1 through 3-5, respectively. This section provides a site-specific presentation of the water level measurements and groundwater and surface water quality sampling results. The discussions are arranged by the GMZs into which each of the sites is grouped. This provides an ability to discuss the contaminant detections in relation to each of the GMZ boundaries.

Each site in Section 3 is organized into the following:

General site-specific background information is presented.

Groundwater Hydraulics: Site or GMZ figures are presented for the water table and potentiometric surface (generally in the bedrock). Monitoring wells are designated as overburden, combined overburden/bedrock, or bedrock wells, which indicates in which aquifer(s) the well is screened. When practical, discussions include the relationship between groundwater flow direction, hydraulic gradients, and contaminant migration.

Analytical Results: For groundwater quality discussions, monitoring wells and surface water sampling points are designated as in-plume, early warning, or compliance points and at Landfill sites as upgradient or downgradient. These designations are included in the LTM Plan and are based on the location of the sampling point relative to historic groundwater detections, site GMZ, and/or site features. Analytical data from 2013 sampling are included in the discussion of analytical results. Contaminant concentrations that are greater than site RGs are included in the discussion even if there is not a notable change in the analytical data for that constituent. Figures are presented for contaminant detections observed during the January (Landfill M13 only) and April 2013 sampling rounds.

Method reporting limits (MRLs) are less than site RGs, except where noted. Analytical results, 'not detected' (ND) are for contaminant concentrations less than the MRL. If there were detections between the method detection limit (MDL) and the MRL, the concentration was qualified "F" as an estimated concentration (F).

Recommendations: Recommendations for each site are presented specific to the conditions of the LTM Plan. A summary of recommendations is presented in Section 4. Since there is little evaluation of trends included in the semi-annual reports, the recommendations included herein are general in nature.

3.1 SITE L1

Site L1 is one of six GMZs created to manage risk arising from groundwater contamination and to monitor performance of the selected remedy. Site L1 comprises 80 acres on which munitions production facilities were constructed in 1941. It is centrally located in the northern portion of the LAP Area as can be seen on Figure 1-2. Historically, Site L1 was used for demilitarization and reclamation of various munitions starting with crystallization of ammonium nitrate, but then was converted for shell renovation and 1,3,5-trinitrobenzene (TNB) recovery up until 1945. By April of 1946, it had been reactivated to reclaim TNT.

In the TNT operation, hot water was used to wash the TNT out of shells. The water was discharged to a sump where solid explosives were removed for burning and the overflow (pink water) was routed to a 4.3-acre ridge and furrow evaporation/percolation pond. By 1952, two additional evaporation ponds had been constructed southeast of the ridge and furrow unit on either side of a drainage ditch flowing from it to Prairie Creek. Prairie Creek, the surface water body draining the area, is incised into the bedrock and appears to transmit groundwater that discharges directly or emerges into the streambed by virtue of the head relief available in the open channel.

Explosive residues in soil were observed in the ridge and furrow impoundment, the western most of the two newer ponds, the area south of the washout building, and the soil around the sump. The underlying groundwater contains TNT, TNB, 2,6-dinitrotoluene (2,6-DNT), and royal demolition explosive (RDX) both in the alluvium and in the shallow weathered bedrock, as well as degradation products from those parent compounds, as a result of the infiltration of pink water and possibly continued leaching of explosives in soil. The footprint of RG exceedances currently extends to the southeast of the source area (in the proximity of MW131) towards monitoring well MW173. Soil source control measures at the ridge and furrow pond were conducted in 2005 to 2006. The contamination is now a residual groundwater plume continuing to migrate to the southeast towards Prairie Creek, where it is believed to largely discharge into the creek through upwelling. Given these observations, the contaminant footprint is expected to separate from the source area over time and migrate in the alluvium and shallow bedrock until it discharges to Prairie Creek.

The overburden aquifer generally consists of a complex stratification of clay and silt, with some silty gravel observed in the eastern portion of the site near MW174. Overburden generally thins from approximately 20 ft in the north to less than 5 ft in the south and from approximately 15 ft in the east to 5 ft in the west.

3.1.1 Groundwater Hydraulics

The groundwater monitoring network at Site L1 consists of 16 wells: 8 overburden wells, 1 combined overburden/bedrock well, and 7 bedrock wells. Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW171, MW172, MW175, MW176, MW177, MW178, MW401, MW610, MW611 and WES2. Monitoring well information and water levels for April are summarized in Table 2-3. The groundwater flow direction in the overburden aquifer is generally toward the southeast as shown on Figure 3-1.

The horizontal gradient in the northern part of Site L1 was calculated to be 0.0113 feet per foot (ft/ft) and 0.0149 in the southern part of the site (Table 3-6). Using the reported average of $9.2\text{E-}06$ centimeters per second (cm/sec) for hydraulic conductivity and an assumed porosity of 0.30, the calculated flow velocity in the overburden at Site L1 was approximately 0.0011 feet per day (ft/day) or 0.416 feet per year (ft/yr) in April (Table 3-7). As stated in the LTM Plan, a value of 16 ft/yr will be used to evaluate data from groundwater early warning sample points, which will accommodate heterogeneities present in the overburden aquifer.

Bedrock wells are installed at shallow depths (<10 ft below top of bedrock). The groundwater flow direction in the bedrock aquifer is generally toward the southeast as shown on Figure 3-2. Prairie Creek, the surface water body draining the area, is incised into the bedrock in the southern and central parts of the site and appears to transmit groundwater that discharges directly or upwells into the streambed by virtue of the head relief available in the open channel. There is no evidence that contamination flows beneath Prairie Creek as it has not appeared in monitoring wells to the west. The groundwater elevation at monitoring well MW611 was greater than the elevation of Prairie Creek, indicating a gaining stream scenario. Vertical gradients observed were upward at well nests MW171/MW177 and MW172/MW173 and downward at well nests MW401/MW610 and MW178/MW176 in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with historically observed flow directions. Based on groundwater flow data, Prairie Creek is the likely discharge point for shallow groundwater in the vicinity of Site L1.

3.1.2 Analytical Results

Groundwater and surface water sampling points for Site L1 during April 2013 are summarized in Table 1-1. The following monitoring wells and the surface water sampling location at L1 are sampled for explosives:

- In-Plume – MW131, MW173, and WES1
- Early Warning – MW174 and WES3
- Compliance –surface water sampling point SW550 for the overburden aquifer

Groundwater and surface water samples collected at Site L1 in April 2013 were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for April 2013 sampling conducted at Site L1 are summarized in Table 3-1 and on Figure 3-3. A brief discussion of analytical results by well type follows.

In-Plume Wells (MW131, MW173, and WES1): At overburden monitoring well MW131, TNB exceeded the RG at a concentration of 3,100 micrograms per liter (µg/L) and TNT exceeded the RG at a concentration of 4,200 µg/L for the April sampling event. Additionally, 2-amino-4,6-dinitrotoluene (2-A-4,6-DNT) and 4-amino-2,6-dinitrotoluene (4-A-2,6-DNT) were detected. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT.

At overburden monitoring well MW173, there were no RG exceedances. However, 2-A-4,6-DNT, 4-A-4,6-DNT, High Melting-point Explosive (HMX), RDX, and TNT were detected for the April sampling event. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT.

At bedrock monitoring well WES1, TNB exceeded the RG at a concentration of 16 µg/L and TNT exceeded the RG at a concentration of 25 µg/L for the April sampling event. Additionally, 2,6-DNT, 2-A-4,6-DNT, 4-A-4,6-DNT, and nitrobenzene (NB) were detected. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT.

The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from in-plume monitoring wells indicate contaminant reduction is occurring.

Early Warning Wells (MW174 and WES3): At overburden monitoring well MW174 there were no explosives detections for the April sampling event.

At bedrock monitoring well WES3, there were no RG exceedances. However, 2-A-4,6-DNT, 4-A-2,6-DNT, RDX, and TNT were detected for the April sampling event. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT. The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from early warning monitoring well WES3 indicate contaminant reduction is occurring.

Compliance Point (SW550): At surface water sampling point SW550, there were no detections of explosive compounds for the April sampling event.

3.1.3 Recommendations

There are no recommended changes in the monitoring program or network. Sampling at Site L1 should be performed during the fall 2013 sampling event as outlined in Table 3-9.

3.2 SITE L3/LANDFILL L3

Site L3 is the third of six GMZs created to manage risk arising from groundwater contamination and to monitor performance of the selected remedy. Site L3 comprises approximately 50 acres used as a demolition area directly southwest of Site L2 (Figure 1-2). Landfill L3 (described below) occupies 3.32 acres of the Site L3 area (Figure 3-4). Site L3 is bounded on the west by Prairie Creek, the south by an unnamed tributary of Prairie Creek, and the east by Star Grove Cemetery. Predominant use of the area was for open burning of combustibles and munitions crates, including some materials with low level explosive contamination. An air curtain destructor was constructed at the site to reduce emissions, but was never put into use. There was also a one-acre fire training area at the site, a small depression surrounded by an earthen berm.

Specific burning units included “U” and “L” shaped burn pads and a burn cage on a concrete slab. Geophysical surveys noted a number of metallic anomalies buried around the burn pads. The soil was also found to contain lead and RDX contamination at levels requiring remediation. Berms along Prairie Creek were found to contain lead, chlordane, 2,6-DNT, and phosphate above their respective RGs. It has been posited that the contamination in these berms arises from filling activity in the area when the berms were constructed. Unexploded ordnance may also be present in this area. The remedy selected for the area along Prairie Creek was consolidation and capping into what is now called Landfill L3.

Landfill L3 is located along the western edge of the Site L3 GMZ on the east bank of Prairie Creek, as illustrated on Figure 3-4. The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the Site L3 Landfill as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and quickly be discharged as the groundwater flows upward into the surface water body.

Monitoring at Landfill L3 is mandated by IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed; and
- Keep survey points protected and visible to facilitate identification in the future.

Groundwater in overburden well MW410 is primarily produced from a silt layer that the well is screened across. Samples from combination well MW630 and bedrock well MW412 are obtained at shallow depths (<10 ft below top of bedrock), while samples from bedrock wells MW631 and MW633 are obtained from intermediate depths (10 to 20 ft below top of bedrock).

3.2.1 Groundwater Hydraulics

The groundwater monitoring network at Site L3/Landfill L3 consists of 11 wells: 4 overburden wells, 2 combined overburden/bedrock wells, and 5 bedrock wells. Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW1, MW3, MW136, MW137, MW411, and MW632. Additionally, the water level was measured in April at Site L2 (which was not sampled in April) monitoring well MW134 to provide horizontal groundwater level control. Monitoring well information and water levels for April are summarized in Table 2-3. Surface water elevation in the northern portion of the site is dictated by the dam located on Prairie Creek just north of Central Road (Figure 3-4). The groundwater flow direction in the overburden aquifer is generally toward the west/southwest as shown on Figure 3-4.

The horizontal gradient in the overburden aquifer at Site L3 was calculated to be 0.0261 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of $1.6\text{E-}03$ cm/sec and an assumed porosity of 0.3, the flow velocity in the overburden aquifer at Site L3 was approximately 0.3945 ft/day or 144 ft/yr in April (Table 3-7). There are no wells directly downgradient of MW410 or MW412 from which apparent travel times could be estimated. RDX had historically been observed in Prairie Creek, indicating it had migrated the intervening distance over the last 50 to 60 years but, because the contamination appears to arise from fill activity in the area, the presence of RDX in Prairie Creek water may represent contamination that started much closer to the stream bank than either of the in-plume monitoring wells. Empirical data at Sites L1 and L2 have suggested transport rates more on the order of 2.5 to 11 ft/yr, but hydraulic conductivity may be higher in the disturbed soil of Site L3 and higher gradients found proximate to the discharge line along Prairie Creek. Accordingly, the larger of the two velocities, 11 ft/yr, is assumed for Site L3.

The groundwater flow direction in the bedrock aquifer is generally toward the west as shown on Figure 3-5. Prairie Creek, the surface water body draining the area, is incised into the bedrock in the southern and central parts of the site and appears to transmit groundwater that discharges directly or upwells into the streambed by virtue of the head

relief available in the open channel. There is no evidence that contamination flows beneath Prairie Creek as it has not appeared in monitoring wells to the west. The groundwater elevation at monitoring well MW632 was greater than the elevation of Prairie Creek, indicating a gaining stream scenario. An upward vertical gradient was observed at well nest MW630/MW631 at Site L3 in April (Table 3-8), further supporting a gaining stream scenario.

The April overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site L3/Landfill L3.

3.2.2 Analytical Results

Groundwater and surface water sampling points for Site L3/Landfill L3 during April 2013 are summarized in Table 1-1. The following monitoring wells and surface water sampling points at L3 are sampled for explosives and TAL metals:

- Upgradient – surface water sampling point SW004, where the creek first touches the GMZ boundary and upstream of the storm water outfall
- In-Plume/Downgradient – MW410 and MW412
- Early Warning/Downgradient – MW630, MW631, and MW633
- Compliance/Downgradient – surface water sampling point SW777 for the overburden aquifer, where the creek leaves the GMZ boundary
- Downgradient - Surface water sampling points SW557, upstream of the landfill drainage swale discharge, and SW558, at the constructed drainage swale along the southwest side of the landfill

Groundwater and surface water samples collected at Site L3/Landfill L3 in April were analyzed for explosive compounds and TAL metals in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compounds detected during April 2013 sampling conducted at Site L3 are summarized in Table 3-1 and illustrated on Figure 3-6. Metals detected during April sampling conducted at L3/Landfill L3 are summarized in Table 3-2. For Landfill L3, the monitoring well locations are classified as upgradient or downgradient locations. Therefore, the same well can represent two separate classifications at Site L3/Landfill L3. A brief discussion of analytical results by well type follows:

Upgradient Point (SW004): At surface water sampling point SW004, there were no detections of explosive compounds or metals RG exceedances for the April sampling event. However, the MRL for cadmium and silver were above the RG.

In-Plume Wells (MW410 and MW412 {downgradient}): At overburden monitoring well MW410, there were no explosive compound detections or metals RG exceedances for the April sampling event.

At bedrock monitoring well MW412, RDX detections continued to exceed the RG at a concentration of 74 µg/L for the April sampling event. Additionally, 2-A-4,6-DNT, 4-A-2,6-DNT, and HMX were detected. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT. There were no metals RG exceedances for the April sampling event. The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from in-plume monitoring well MW412 indicate contaminant reduction is occurring.

Early Warning (downgradient) Wells (MW630, MW631, and MW633): At bedrock monitoring well MW630, there was a RG exceedance for RDX at a concentration of 6.1 µg/L for the April sampling event. Additionally, 2-A-4,6-DNT, 4-A-4,6-DNT, and HMX were detected. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT and HMX was detected below the RG. There were no metals RG exceedances for the April sampling event. The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from early warning monitoring well MW630 indicate contaminant reduction is occurring.

At bedrock monitoring well MW631, there were no explosive compound detections and metals detections were all below their RGs for the April sampling event.

At bedrock monitoring well MW633, there were no RG exceedances for explosives compounds. However, HMX and RDX were detected in the April sampling event. There were no metals RG exceedances for compounds detected in the April sampling event.

Compliance (downgradient) Points (SW777): At surface water sampling point SW777, there were no detections of explosive compounds and no metals detections exceeded the RG for the April sampling event. However, the MRL for cadmium and silver were above their RGs.

Additional Downgradient Points (SW557 and SW558): At surface water sampling point SW557, there were no detections of explosive compounds and no metals detections exceeded the RG for the April 2013 sampling event. However, the MRL for cadmium and silver were above their RGs.

At surface water sampling point SW558, there were no detections of explosive compounds and no metals detections exceeded the RG for the April 2013 sampling event. However, the MRL for cadmium and silver were above their RGs.

3.2.3 Recommendations

There are no recommended changes to the monitoring program or network. Sampling at Site L3/Landfill L3 should be performed during the fall 2013 sampling event as outlined in Table 3-9.

3.3 SITE M1

Site M1, the southern ash pile, is part of the MFG facility (Figure 1-2), but contains unique contaminants not present at actionable levels at any other GMZ. As such, it is singled out as the fifth of the six GMZs. Site M1 comprises 68 acres in the southwestern part of the MFG facility, where from 1965 to 1974, ash residues from the incineration of “red water” (TNT production waste water) were landfilled and placed on unlined soil. At various times (1985, 1993, and 1996) after closure, polyvinyl chloride (PVC) and clay were used to repair erosion damage to the cover.

Groundwater beneath and downgradient of the pile was observed to contain elevated levels of sulfate, 2,6-DNT, and antimony. The latter two compounds exceeded their respective RGs on a single sample event only, but the sulfate has exceeded its RG continuously in groundwater and occasionally in surface water. In February 2003, the United States Army Corps of Engineers (USACE) submitted *Explanation of Significance Difference Site M1 – Southern Ash Pile* (USACE, 2003), which expanded the northern boundary of the GMZ for Site M1 to encompass concentrations of sulfate in excess of the RG that had migrated beyond the original boundary.

The elevated sulfate is believed to originate in leachate from the Site M1 ash pile that infiltrated through the soil and entered the shallow groundwater. Dissolved sulfate then migrated to the northwest. Sulfate-containing groundwater flows into Prairie Creek, which is located northwest of the former ash pile. Concentrations of sulfate have been measured as high as 46,000 milligrams per liter (mg/L), which is over 100 times the RG of 400 mg/L. As recently as 2000, surface water samples were collected that exceeded the RG of 500 mg/L. The ash piles were removed in 2006-2007 eliminating the primary source of sulfate. Consequently, dissolved sulfate in groundwater is now a residual plume migrating to the northwest.

The overburden aquifer primarily consists of silt and clay, with scarce amounts of sand and silty gravel at the bedrock contact. Sand is abundant in the higher, unsaturated, parts of the site. Over most of Site M1, the overburden thickness is fairly consistent between 15 and 20 ft thick. At the northern end of the site, near MW642/MW641, the overburden consists entirely of silty gravel and the depth to bedrock is greater than 40 ft. The presence of Prairie Creek in the western part of M1 suggests that Prairie Creek is the discharge point for shallow groundwater.

3.3.1 Groundwater Hydraulics

The groundwater monitoring network within this site consists of 18 wells: 10 overburden wells, 4 combined overburden/bedrock wells, and 4 bedrock wells. Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW104, MW105, MW106, MW201, MW347, MW351, and MW647. Monitoring well information and water levels for April are summarized in Table 2-2. The

groundwater flow direction in the overburden aquifer is generally to the northwest, as shown on Figure 3-7.

The horizontal gradient at Site M1 was 0.0412 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of 6.6E-05 cm/sec and an assumed porosity of 0.3, the flow velocity in the overburden aquifer at Site M1 was approximately 0.0257 ft/day or 9.4 ft/yr in April (Table 3-7). However, these calculated values would indicate that the plume should be on the order of 80 ft from the ash pile after 40 years of travel time (1965 to 2005). In fact, by 2005, the elevated sulfate levels were observed at MW645, which is a distance of 2,060 ft. from the source area, which suggests a flow velocity of approximately 50 ft/yr.

The groundwater flow direction in the bedrock aquifer is generally toward the northwest, as shown on Figure 3-8. Downward vertical gradients were observed at well nests MW351/MW640 and MW641/MW642 in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site M1.

3.3.2 Analytical Results

Groundwater sampling points for Site M1 during April 2013 are summarized in Table 1-1. The following monitoring wells and the surface water sampling point at M1 are sampled for sulfate:

- In-Plume – MW107, MW231, MW640, MW641, and MW642
- Early Warning – MW643 and MW644
- Compliance – MW646 for the bedrock aquifer and MW645, MW648, and MW649 and surface water sampling point SW709 where the creek leaves the GMZ boundary for the overburden aquifer

Groundwater and surface water samples collected at Site M1 in April were analyzed for sulfate in accordance with Appendix B (QAPP) of the LTM Plan. Sulfate detections for the April sampling event conducted at Site M1 are summarized in Table 3-3 and shown on Figure 3-9. A brief discussion of analytical results by well type follows:

In-Plume Wells (MW107, MW231, MW640, MW641, and MW642): At monitoring well MW107, sulfate exceeded the RG at a concentration of 17,000 mg/L for the April sampling event.

At monitoring well MW231, sulfate exceeded the RG at a concentration of 32,000 mg/L for the April sampling event.

At monitoring well MW640, sulfate exceeded the RG at a concentration of 6,800 mg/L for the April sampling event.

At monitoring well MW641, sulfate exceeded the RG at a concentration of 480 mg/L for the April sampling event.

At monitoring well MW642, sulfate exceeded the RG at a concentration of 410 mg/L for the April sampling event.

Early Warning Wells (MW643 and MW644): At monitoring wells MW643 and MW644, sulfate was detected at concentrations below the RG for the April sampling event.

Compliance Points (MW645, MW646, MW648, MW649, and SW709): At monitoring wells MW645, MW646, MW648, and MW649 and surface water sampling point SW709, sulfate was detected at concentrations below the RG for the April sampling event.

3.3.3 Recommendations

There are no recommended changes in the monitoring program or network. Sampling at Site M1 should be performed during the fall 2013 sampling event as outlined in Table 3-9.

3.4 MFG

The MFG Area is the sixth GMZ, lies in the northwestern part of JOAAP, and was created by the consolidation of several discrete sites including M3, M4, M5, M6, M7, M8, M13, and outlying wells deemed as “Other Areas”. The MFG Area GMZ is illustrated on Figure 1-2. Each of these areas hosted unique operations that led to the release of different contaminants. Groundwater contamination consisting of explosive compounds, excluding contamination from Landfill M13, is being managed collectively and is included as Section 3.5. Of the areas in the MFG Area, only Sites M6, M8, and M13 continue to have groundwater contamination with COCs in excess of RGs. Each site comprising the MFG GMZ will be independently closed before the MFG GMZ can be eliminated.

Monitoring wells from Sites M6, M7, M8, and Other Areas continue to be included in the MFG groundwater sampling. Numerous monitoring wells are also measured as water level control points at these other sites.

3.4.1 Site M6

Site M6, the TNT Ditch Complex, covers 271 acres to the northwest of Site M5 in the central part of the MFG Area (Figure 1-2) and was largely used for TNT and DNT production during World War II, and then again in the Korean and Vietnam Wars. In between the wars, the facilities were used for research and development of different explosives like nitroxylenes. Production of TNT was terminated in 1977.

Production of TNT was conducted in 12 parallel lines, each containing a full sequence of production steps from the “mono-house” to the “bi-house” and then the “tri-house” buildings. Waste water (“red water”) from each “tri-house” and the wash houses was discharged from wooden tanks to clay-lined ditches feeding into the TNT Ditch. In 1965, the original drainage system was replaced by wooden flumes completed in the TNT Ditch and the red water was diverted to Site M7 for treatment. Dinitrotoluene production waste water was discharged from wooden tanks into open troughs and ditches that flowed to the storm water sewer system and the TNT Ditch, ultimately flowing untreated into Grant Creek. In addition to normal processing water, the TNT Ditch received drench water used to kill a production run when reactions ran out of control and posed an explosive threat. Between 1972 and 1974, there were more than 30 recorded instances of drenching with the associated discharge of “bi-oil” and concentrated nitric and sulfuric acid.

The overburden aquifer primarily consists of silt and clay, with variable amounts of sand and silty gravel. The overburden thickness ranges from 5 to 30 ft across the site. Based on available information, screens for overburden wells at Site M6 are set in silt and/or clay layers with the exception of monitoring wells MW650 and MW652; which have screens set in a silty gravel layer.

3.4.1.1 Groundwater Hydraulics

The groundwater monitoring network within Site M6 consists of 39 wells: 14 overburden wells, 2 combined overburden/bedrock wells, and 23 bedrock wells. Water levels are measured at the groundwater locations that are sampled (listed below), and at numerous monitoring wells at M6 and sites including M3, M4, M5, M8, and “Other Areas”. Monitoring well information and water levels for April are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer is generally toward the west as shown on Figure 3-10.

The horizontal gradient in the northern part of Site M6 was calculated to be 0.0180 ft/ft and in the southern part of Site M6 was calculated to be 0.0243 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of $8.6\text{E-}04$ cm/sec and an assumed porosity of 0.30, the flow velocity at Site M6 was approximately 0.1722 ft/day or 62.9 ft/yr in April (Table 3-7). However, at Site M6, COCs have not been detected at wells 600 ft directly downgradient (MW212R to MW123R and MW162R). Given the 60 years that have passed since releases began at Site M6, this suggests the transport time for RDX and TNT is less than $600 \text{ ft} / 60 \text{ years} = 10 \text{ ft/yr}$. A rate of 10 ft/yr is comparable to transport rates calculated for other areas of JOAAP.

The groundwater flow direction in the bedrock aquifer is generally toward the west as shown on Figure 3-11. Screens for bedrock monitoring wells MW123, MW314, MW316, MW318, and MW654 are set at shallow depths (<10 ft below top of bedrock), while screens for monitoring wells MW118, MW119, MW213R, MW215R, MW310R, MW311, MW313, and MW653 are set at intermediate depths within the bedrock aquifer (10 to 20 ft

below top of bedrock). Screens for monitoring wells MW312, MW315, MW317, MW320, MW651, and MW655 are set deeper within the bedrock aquifer (>20 ft below top of bedrock). Vertical gradients were generally downward for well nests located along the escarpment, where the former TNT load lines were oriented at Site M6, and were upward in the wetland immediately to the west in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

3.4.1.2 Analytical Results

Groundwater sampling points for Site M6 during April 2013 are summarized in Table 1-1. The following monitoring wells at M6 and other sites included in the M6 grouping are sampled for explosives:

- In-Plume – MW212R, MW652, and MW330 (M8)
- Early Warning – MW123R, MW162R, MW313, MW318, MW319, and MW654
- Compliance – MW117 and MW118 and MW119 (Other Areas).

Groundwater samples collected at Site M6 in April were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Monitoring well MW330 was sampled for sulfate. Explosive compound detections for the April sampling event conducted at Site M6 are summarized in Table 3-1 and shown on Figure 3-12. Sulfate detections the April sampling event conducted at Site M6 are summarized in Table 3-3. A brief discussion of analytical results by well type follows:

In-Plume Wells (MW212R, MW652, and MW330): At monitoring well MW212R, 2,4-dinitrotoluene (2,4-DNT, 1,500 µg/L), 2,6-DNT (440 µg/L), and TNT (140 µg/L) exceeded their RGs for the April sampling event. Additionally, 1,3-dinitrobenzene (1,3-DNB), 2-A-4,6-DNT, 4-A-2,6-DNT, NB, 3-nitrotoluene (3-NT), 4-nitrotoluene (4-NT), RDX, and TNB were detected but at concentrations below their RGs. There are no RGs for 2-A-4,6-DNT, 4-A-4,6-DNT, 3-NT, or 4-NT.

At monitoring well MW652, 2,4-DNT (1,700 µg/L), 2,6-DNT (480 µg/L), 2-nitrotoluene (2-NT, 7,800 µg/L), and TNT (270 µg/L) detections exceeded the RG for the April sampling event. Additionally, 1,3-DNB, 2-A-4,6-DNT, 4-A-2,6-DNT, NB, 3-NT, 4-NT, RDX, and TNB were detected but at concentrations below their RGs. There are no RGs for 2-A-4,6-DNT, 4-A-4,6-DNT, 3-NT, or 4-NT.

The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from in-plume monitoring wells indicate contaminant reduction is occurring.

At monitoring well MW330, sulfate exceeded the RG at a concentration of 530 µg/L for the April sampling event.

Early Warning Wells (MW123R, MW162R, MW313, MW318, MW319, and MW654):

At monitoring wells MW123R and MW162R there were no explosives detections for the April sampling event.

At monitoring well MW313, there were no RG exceedances. However RDX was detected at a concentration of 0.061 ug/L for the April sampling event. In October 2012 2,4-DNT and 2,6-DNT exceeded their RGs and were reported as being suspect since there had been no previous detections for 2,4-DNT and 2,6-DNT. In April 2013 neither compound was detected. Therefore, the detections in October 2012 are considered anomalous.

At monitoring well MW318, the detection of 2,6-DNT exceeded the RG at a concentration of 0.79 ug/L for the April sampling event. Additionally, HMX and TNB were detected but at concentrations below their RGs.

At monitoring well MW319, there were no RG exceedances of explosive compounds for the April sampling event. However, 2-A-4,6-DNT was detected at a concentration of 6.2 ug/L and HMX was detected at a concentration of 57 ug/L. There is no RG for 2-A-4,6-DNT. The detection of the degradation product 2-A-4,6-DNT in the sample collected from early warning monitoring well MW319 indicate contaminant reduction is occurring.

At monitoring well MW654, there were no RG exceedances. However, 2,4-DNT, 2,6-DNT, were detected at concentrations below their RGs, which had exceeded their RGs in April and October 2012 following no detections since 2010 and fluctuation prior to that. Therefore, there are no trends established. Additionally, 2-A-4,6-DNT, 4-A-2,6-DNT, 2-NT, RDX, and TNB were detected for the April sampling event but at concentrations below their RGs. There are no RGs for 2-A-4,6-DNT and 4-A-4,6-DNT. The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from early warning monitoring well MW654 indicate contaminant reduction is occurring.

Compliance Wells (MW117 and MW118 and MW119): At monitoring wells MW117, MW118, and MW119, there were no detections of explosive compounds for the April sampling event. In October 2012 2,4-DNT exceeded the RG at monitoring wells MW117 and MW118 and were reported as being suspect since there had been no previous detections for 2,4-DNT. In April 2013 2,4-DNT was not detected at either well. Therefore, the detections in October 2012 are considered anomalous.

3.4.1.3 Recommendations

There are no changes in the monitoring program or network recommended. Sampling at Site M6 should be performed during the fall 2013 sampling event as outlined in Table 3-9.

3.4.2 Site M7

Site M7, the Red Water Area, comprises 49 acres in the central part of the MFG Area between Site M6 and Site M7 on the west bank of the TNT Ditch (Figure 1-2). Facilities at

Site M7 included storage tanks, pump stations, evaporators, and incinerators used to destroy the red water from Site M6 after construction in 1965. Overflows of untreated red water were stored in the Red Water Lagoon, a 3.3 acre impoundment that was remediated in 1985.

Contaminants of concern in soil included TNT, 2,4-DNT, 2,6-DNT, TNB, and RDX. Source areas in soil included the drainage areas in the northwest part of Site M7. Soil RA activities were completed in 2001 at Site M7. Explosive compounds have been observed in the underlying groundwater at concentrations that exceed their respective RGs include TNT, 2,4-DNT, 2,6-DNT, 2-NT, TNB, NB, and RDX.

The overburden aquifer primarily consists of silt and clay, with some sand and gravel in the upper, unsaturated, part of the aquifer. The overburden thickness ranges from less than 5 to more than 10 ft across Site M7. Based on available information, samples from overburden wells are obtained from discontinuous sand and gravel layers.

3.4.2.1 Groundwater Hydraulics

The groundwater monitoring network at Site M7 consists of 9 wells: 4 overburden wells, 1 combined overburden/bedrock well, and 4 bedrock wells. Water levels are measured at each groundwater location that is sampled (listed below), and at monitoring wells MW156, MW159, MW216, MW217, MW321, MW322, MW660, and MW661. Monitoring well information and water levels for April are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer in the immediate vicinity of Site M7 is generally toward the west/southwest as shown on Figure 3-10.

The horizontal gradient at Site M7 was calculated to be 0.0105 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of 6.7E-04 cm/sec and an assumed porosity of 0.30, the flow velocity at Site M7 was approximately 0.0595 ft/day or 21.7 ft/yr in April (Table 3-7).

The groundwater flow direction in the bedrock aquifer in the immediate vicinity of Site M7 was generally toward the west/northwest in April as shown on Figure 3-11. With the exception of well MW124R, bedrock wells are screened at intermediate depths within the bedrock aquifer (10 to 20 ft below top of bedrock). Bedrock well MW124R and combination well MW157 are screened at a shallow depth within bedrock (<10 ft below top of bedrock). Vertical gradients were calculated for well nests MW216/MW217, MW660/MW661, MW321/MW322, and MW157/MW158 located in the vicinity of Site M7. Calculated vertical gradients were downward at well nests MW321/MW322 and MW660/MW661 and upward at well nest MW216/MW217 (located slightly north) and Site M4 well nest MW157/MW158 (located in the wetland west of the escarpment) (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

3.4.2.2 Analytical Results

Monitoring well MW124R was sampled during April 2013 as an early warning bedrock well as part of the MFG monitoring network (Table 1-1).

The groundwater samples collected at Site M7 in April 2013 were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for the April sampling event conducted at Site M7 are summarized in Table 3-1 and shown on Figure 3-12. A brief discussion of analytical results by well type follows.

Early Warning Well (MW124R): At well MW124R, there were no detections of explosive compounds for the April sampling event.

3.4.2.3 Recommendations

There are no recommended changes in the monitoring program or network. Sampling at Site M7 should be performed during the fall 2013 sampling event as outlined in Table 3-9.

3.5 LANDFILL M13

Landfill M13 comprises approximately 106 acres of the central part of the MFG Area known as the gravel pits. It lies north of the Teteryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area (Figure 1-2).

Landfill M13 is located in the northern part of Site M13 and comprises approximately 10.5 acres. Site features at Landfill M13 and surrounding areas are illustrated on Figure 3-13. Disposal activities were confined to four discrete areas on the site, none of which extended beyond 12 acres in size. Historical records indicate landfilling took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. Other waste management activities at Site M13 involved explosives. Explosive compounds historically observed in the groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT.

The Northern Gravel Pit was consolidated and capped (Landfill M13) in the 2007 to 2008 time frame. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

With the implementation of the RA at the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as residual plumes to the west. As such, concentrations are expected to decline with time.

Monitoring at Landfill M13 is mandated by IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 15 years. Long-term monitoring of the landfill cap will include quarterly inspections of the cap, vegetation, and drainage structures. Objectives include:

- Confirm that the cap has controlled leaching at the landfill so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed;
- Keep survey points protected and visible to facilitate identification in the future;
- Ensure the fence and signage installed to restrict site access remain in place and serviceable; and
- Certify that institutional controls remain in place.

The overburden aquifer primarily consists of silt and clay, with abundant sand and gravel in the upper, unsaturated, portion of the aquifer. The overburden thickness is approximately 25 ft and is fairly consistent across Site M13. Samples from overburden wells are obtained from silt and/or clay layers.

3.5.1 Groundwater Hydraulics

The groundwater monitoring network at Landfill M13 consists of 11 wells: 6 overburden wells, 1 combined overburden/bedrock well and 4 bedrock wells. Water levels are measured at the groundwater locations that are sampled (listed below), and at monitoring wells AEHA14R, AEHA15, MW350, MW363, and MW364. Monitoring well information and water levels for January and April are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer for the January and April quarterly sampling events is to the south/southeast as shown on Figures 3-13 and 3-14, respectively. Figure 3-14 includes the surrounding groundwater flow taken from the semi-annual sampling event, as shown on Figure 3-10.

The horizontal gradient at Site M13 was calculated to be 0.0066 ft/ft in January and 0.0024 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of $8.0\text{E-}02$ cm/sec and an assumed porosity of 0.30, the calculated flow velocity at Site M13 was approximately 5 ft/day or 1,820 ft/yr in January and 1.8 ft/day or 662 ft/yr in April (Table 3-7). Chemical data do not support this high of a flow velocity and linear flow velocities are likely on the order of 10 ft/yr based on data from other sites at JOAAP.

The groundwater flow direction in the bedrock aquifer in the immediate vicinity of Landfill M13 for January and April quarterly sampling events was generally toward the southwest as shown on Figures 3-15 and 3-16, respectively. Figure 3-16 includes the surrounding groundwater flow taken from the April semi-annual sampling event, as shown on Figure 3-11. The screens for combination well MW350 and nearby bedrock well MW321 are set at

a shallow depth within the bedrock aquifer (<10 ft below top of bedrock), while the well screen for nearby well MW322 is set at an intermediate depth within the bedrock aquifer (10 to 20 ft below top of bedrock). Downward vertical gradients were observed at well nests MW806/MW807 and MW808/MW809 in January and April. An upward vertical gradient was observed at well nests MW126R/MW362 and MW363/MW364 in January and April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

3.5.2 Analytical Results

Groundwater sampling points for Landfill M13 within the MFG GMZ for the spring 2013 sampling events (quarterly) are summarized in Table 2-1. The following monitoring wells at Landfill M13 are sampled for VOCs, SVOCs, TAL metals, explosives, nitrate, and sulfate:

- Upgradient – MW806 and MW807
- Downgradient – MW126R, MW362, MW808, and MW809

Groundwater samples were collected at Landfill M13 in January and April 2013 and were analyzed for explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs in accordance with Appendix B (QAPP) of the LTM Plan. Detections of explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs for the sampling events conducted at Landfill M13 in spring 2013 are summarized in Tables 3-1, 3-2, 3-3, 3-4, and 3-5, respectively. Explosive compound detections are shown on Figure 3-17. For Landfill M13 the monitoring well locations are classified as upgradient or downgradient locations. A brief discussion of analytical results by well type follows:

Upgradient (MW806 and MW807):

Explosives - At monitoring wells MW806 and MW807, there were no detections of explosive compounds for the January or April sampling events. In October 2012 2,4-DNT and 2,6-DNT exceeded their RGs and were reported as being suspect since there had been no previous detections for 2,4-DNT and 2,6-DNT. In April 2013 neither compound was detected. Therefore, the detections in October 2012 are considered anomalous. However, the MRL for 2,4-DNT was above the RG for monitoring well MW806 in April.

Metals - At monitoring wells MW806 and MW807, there were no RG exceedances for detected metals for the January or April sampling events.

Indicator Parameters - At monitoring well MW806, there were detections but no RG exceedances for nitrate for the January or April sampling events. At monitoring well MW807, there were no detections for nitrate for the January or April sampling events. At

monitoring wells MW806 and MW807, there were detections but no RG exceedances for sulfate for the January or April sampling events.

VOCs - At monitoring well MW806, methylene chloride was detected in January and April. At monitoring well MW807, 1,1-dichloroethane (1,1-DCA), cis-1,2-dihloroethene (cis-1,2-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and trichloroethene (TCE) were detected but at concentrations below their RGs in January or April. Methylene chloride was detected in January. However, there is no RG for methylene chloride.

SVOCs - At monitoring wells MW806 and MW807, there were no detections of SVOCs for the January or April sampling events.

Downgradient (MW126R, MW362, MW808, and MW809):

Explosives - At monitoring wells MW126R and MW808, there were no detections of explosive compounds for the January or April sampling events.

At monitoring well MW362, 2,4-DNT exceeded the RG for the January (7.3 ug/L) and April (3.9 ug/L) sampling events. Additionally, 2,6-DNT, 2-A-4,6-DNT, 4-A-2,6-DNT, 2-NT and 3-NT were detected for the January and April sampling events but at concentrations below the RG, as applicable. There are no RGs for 2-A-4,6-DNT and 4-A-2,6-DNT. In addition, TNB was detected at a concentration below the RG for the April sampling event. The detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from downgradient monitoring well MW362 indicate contaminant reduction is occurring.

At monitoring well MW809, 2,4-DNT was detected below the RG in January. In April 2,4-DNT was not detected. However, the MRL for 2,4-DNT was above the RG.

Metals - At monitoring wells MW126R, MW362, MW808, and MW809, there were no RG exceedances for detected metals for the January or April sampling events.

Indicator parameters - At monitoring wells MW126R (April and January), MW362 (January), MW808 (April), and MW809 (April), there were detections but no RG exceedances for nitrate. At monitoring wells MW126R, MW362, and MW809, there were detections but no RG exceedances for sulfate for the January or April sampling events. At monitoring well MW808, sulfate exceeded the RG at a concentration of 490 mg/L for the April sampling event.

VOCs - At monitoring well MW126R, there were no VOC detections for the January and April sampling events. At monitoring well MW362, there were detections for 1,1-DCA and tetrachloroethene (PCE) but no RG exceedances for the January and April sampling events. At monitoring well MW808, there was a detection for methylene chloride in January but not in April. However, there is no RG for methylene chloride. At monitoring well MW809, there were no VOC detections for the January and April sampling events.

SVOCs - At monitoring wells MW126R, MW808, and MW809, there were no detections of *SVOCs* for the January and April sampling events. At monitoring well MW362, there were RG exceedances for 2,4-DNT in January (4.3 ug/L) and April (1.8 ug/L) which confirmed the exceedances in the explosives analysis.

3.5.3 Recommendations

Sampling at Landfill M13 should be performed during quarterly summer and fall 2013 sampling events as outlined in Table 3-9. Future sampling will determine if the sulfate exceedance detected at Site M13 monitoring well MW808 is an anomaly.

4.0 SUMMARY OF RECOMMENDATIONS

Recommendations included in previous groundwater monitoring reports relevant to modifications to the LTM Program are summarized in Table 4-1. The following presents additional recommendations.

- The monitoring program as outlined in Table 3-9 should be implemented for the fall 2013 sampling event.
- Future sampling will determine if the sulfate exceedance detected at Site M13 monitoring well MW808 is an anomaly.
- Required monitoring well repairs summarized in Section 2.1.2 for MW116 will be completed during the fall 2013 sampling round.
- Clearing completed by Midewin National Tallgrass Prairie exposed two monitoring wells. One is located in the eastern M4 area and one is located to the west of the railroad tracks, west of M6. Neither monitoring well has an identifier nor are they located on any recent JOAAP maps. These monitoring wells should be abandoned. A new lock was installed on the monitoring well located in the M4 area.

5.0 REFERENCES

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TABLES

Table 1-1

Spring 2013 Sample Parameters
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Well ID	Parameter
L1	<i>In-plume</i>	
	MW131	E
	MW173	E
	WES1	E
	<i>Early Warning</i>	
	WES3	E
	MW174	E
	<i>Compliance</i>	
	SW550	E
L3/ Landfill L3	<i>Upgradient</i>	
	SW004	E, M
	<i>In-plume/Downgradient</i>	
	MW410	E
	MW412	E, M
	<i>Early Warning/Downgradient</i>	
	MW630	E, M
	MW631	E, M
	MW633	E, M
	<i>Compliance/Downgradient</i>	
	SW777	E, M
	<i>Downgradient</i>	
	SW557	E, M
	SW558	E, M
M1	<i>In-plume</i>	
	MW107	S
	MW231	S
	MW640	S
	MW641	S
	MW642	S
	<i>Early Warning</i>	
	MW643	S
	MW644	S
	<i>Compliance</i>	
	MW645	S
	MW646	S
	MW648	S
	MW649	S
	SW709	S
MFG	<i>In-plume</i>	
	MW212R	E
	MW330	S
	MW652	E
	<i>Early Warning</i>	
	MW123R	E
	MW124R	E
	MW162R	E
	MW313	E
	MW318	E
	MW319	E
	MW654	E

Table 1-1

**Spring 2013 Sample Parameters
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

Site	Well ID	Parameter
MFG	<i>Compliance</i>	
	MW117	E
	MW118	E
	MW119	E
Landfill M13 ⁽¹⁾	<i>Upgradient</i>	
	MW806	E, I, M, SVOC & V
	MW807	E, I, M, SVOC & V
	<i>Downgradient</i>	
	MW126R	E, I, M, SVOC & V
	MW362	E, I, M, SVOC & V
	MW808	E, I, M, SVOC & V
	MW809	E, I, M, SVOC & V

General Notes:

E - Explosives

M - Target Analyte List Metals

S - Sulfate

MFG = Manufacturing Area

I - Indicator Parameters (Nitrate-N and Sulfate)

SVOC - Semi-Volatile Organic Compounds

V - Volatile Organic Compounds

Footnotes:

(1) Site M13 Landfill monitoring wells were also sampled quarterly in January for these parameters in compliance with Illinois Administrative Code.

Table 2-1

Summary of Final Field Parameters
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Well ID	Sample Date	pH (SU)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)
L1	In-plume							
	MW131	4/13/2013	8.33	113	3.8	14.3	9.6	85
	MW173	4/13/2013	7.70	244	15.4	17.6	7.4	-23
	MW174	4/13/2013	7.90	101	6.9	14.9	7.5	58
	WES1	4/13/2013	8.02	145	14.2	18.6	10.4	66
	Early Warning							
	WES3	4/13/2013	7.85	110	6.8	19.1	10.3	47
L3	Compliance							
	SW550	4/14/2013	7.67	901	59.8	11.0	10.4	120
	Upgradient							
	SW004	4/16/2013	8.35	608	218.0	11.7	9.2	131
	In-plume/Downgradient							
	MW410	4/16/2013	7.56	139	46.6	17.0	11.5	11
	MW412	4/15/2013	7.99	707	16.3	7.1	7.0	136
	Early w Warning/Downgradient							
	MW630	4/16/2013	7.99	109	44.8	19.5	8.1	72
	MW631	4/16/2013	7.90	99	55.7	18.7	9.6	-7
	MW633	4/15/2013	8.02	100	70.1	19.3	7.3	69
	Compliance/Downgradient							
	SW777	4/16/2013	8.44	588	152.0	11.3	8.8	136
M1	Downgradient							
	SW557	4/16/2013	8.41	612	169.0	11.3	9.3	130
	SW558	4/16/2013	8.62	433	62.5	12.0	8.3	130
	In-plume							
	MW107	4/11/2013	10.23	4530	14.3	14.3	9.9	-39
	MW231	4/12/2013	9.87	7240	45.9	11.8	6.7	-273
	MW640	4/15/2012	7.42	1310	36.4	17.0	10.9	-125
	MW641	4/12/2013	7.56	2110	17.7	1.0	7.7	-89
	MW642	4/15/2013	7.76	1550	23.2	3.2	10.6	123
	Early Warning							
	MW643	4/11/2013	7.50	952	14.0	2.5	6.0	129
	MW644	4/11/2013	7.91	1000	11.7	6.3	8.1	106
	Compliance							
	MW645	4/11/2013	8.08	137	21.8	17.6	6.8	72
	MW646	4/11/2013	8.46	125	44.0	17.7	8.8	60
	MW648	4/11/2013	7.87	521	19.6	8.6	7.2	128
	MW649	4/11/2013	7.63	992	17.8	2.8	7.6	109
MFG	SW709	4/11/2013	10.23	100	111.0	17.6	5.9	5
	In-plume							
	MW212R	4/11/2013	7.80	734	23.7	1.5	9.2	104
	MW330	4/10/2013	7.48	1450	26.8	4.7	9.7	168
	MW652	4/10/2013	7.42	1020	14.0	1.1	8.6	108
	Early Warning							
	MW123R	4/10/2013	7.25	1440	52.6	1.1	9.4	46
	MW124R	4/10/2013	7.86	120	22.0	14.0	7.9	-91
	MW162R	4/10/2013	7.75	570	11.8	6.6	6.3	101
	MW313	4/11/2013	8.13	194	14.0	17.1	10.9	22
	MW318	4/10/2013	7.90	161	7.3	18.1	10.0	-260
	MW319	4/10/2013	8.03	180	4.9	16.8	11.0	-143
	MW654	4/11/2013	7.97	338	4.5	17.1	9.5	24
	Compliance							
	MW117	4/10/2013	7.69	991	21.3	1.4	8.0	-132
Landfill M13	MW118	4/10/2013	7.76	831	11.8	2.0	7.3	79
	MW119	4/10/2013	8.03	250	12.1	13.1	7.5	93
	Upgradient							
	MW806	1/31/2013	8.06	802	10.0	5.5	12.4	61
		4/9/2013	8.04	110	30.0	18.4	12.7	155
	MW807	1/31/2013	7.53	3830	17.3	3.6	13.1	-113
		4/9/2013	7.74	486	31.0	18.0	13.5	-223
	Downgradient							
	MW126R	1/30/2013	7.69	108	4.8	6.7	13.6	76
		4/9/2013	7.65	769	11.8	3.2	11.5	103
	MW362	1/30/2013	7.78	416	3.0	5.8	13.3	134
		4/9/2013	7.91	2740	10.8	4.4	11.9	96
	MW808	1/30/2013	7.21	223	5.7	6.4	13.2	-108
		4/9/2013	7.37	268	56.1	18.1	11.5	36
	MW809	1/30/2013	8.26	965	4.8	4.8	12.1	-56
		4/9/2013	8.07	525	11.7	1.5	12.9	-56

Notes:
ID = Identification
SU = Standard Units
mS/cm = Microsiemens Per Centimeter
NTU = Nephelometric Turbidity Unit
mg/L = Milligrams Per Liter
°C = Degrees Centigrade
mV = Millivolt
R = Replacement Well
Redox = Reduction/Oxidation Potential

Table 2-2

Monitoring Well Information Table - Manufacturing Area
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Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water January 2013 (TOC)	Water Elevation January 2013 (MSL)	Depth to Water April 2013 (TOC)	Water Elevation April 2013 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW104	M1	15019989.44	1318790.51	549.10	546.20	7.0	27.0	30.0	NM	NM	4.67	544.43	27.00	519.20	1981	OVB	20.0	4.0
MW105		15020111.69	1320854.13	555.00	552.50	7.0	27.0	29.9	NM	NM	4.41	550.59	24.00	528.50	1981	COMBO	20.0	4.0
MW106		15020948.76	1318761.26	542.00	539.70	10.0	30.0	32.0	NM	NM	2.91	539.09	21.00	518.70	1981	COMBO	20.0	4.0
MW107		15021094.20	1320422.28	552.40	549.10	5.5	25.5	27.4	NM	NM	4.66	547.74	17.00	532.10	1981	COMBO	20.0	4.0
MW201		15020020.57	1318931.61	546.15	544.01	46.5	66.5	70.5	NM	NM	2.27	543.88	24.00	520.01	1988	BRK	20.0	4.0
MW231		15020828.13	1319861.02	550.33	548.47	6.0	16.0	15.7	NM	NM	3.36	546.97	16.00	532.47	1988	OVB	10.0	4.0
MW347		15020481.00	1319594.96	551.73	549.84	14.4	24.4	27.0	NM	NM	3.37	548.36	18.50	531.34	1991	COMBO	10.0	4.0
MW351		15021257.77	1319798.88	548.38	545.68	9.5	19.5	22.7	NM	NM	3.33	545.05	22.50	523.18	1991	OVB	10.0	4.0
MW640		15021244.24	1319804.02	548.12	545.40	29.0	39.0	40.0	NM	NM	3.29	544.83	23.00	522.40	1999	BRK	10.0	4.0
MW641		15021873.45	1319350.19	544.50	541.98	7.0	17.0	17.2	NM	NM	1.40	543.10	29.00	516.08	1999	OVB	10.0	4.0
MW642		15021874.37	1319339.91	544.47	541.95	29.0	39.0	40.0	NM	NM	1.78	542.69	29.00	516.08	1999	OVB	10.0	4.0
MW643		15022117.67	1318719.85	540.03	537.55	4.3	7.2	7.8	NM	NM	4.64	535.39	7.25	530.30	2001	OVB	2.9	4.0
MW644		15022128.91	1318718.61	540.23	537.55	10.8	20.4	21.0	NM	NM	4.79	535.44	7.25	530.30	2001	BRK	9.6	4.0
MW645		15022269.11	1318648.69	541.47	538.90	7.5	11.5	12.0	NM	NM	7.08	534.39	10.50	528.40	2001	OVB	4.0	4.0
MW646		15022257.26	1318650.53	541.48	539.09	12.3	21.9	22.5	NM	NM	6.98	534.50	10.50	528.59	2001	BRK	9.6	4.0
MW647		15022572.85	1318012.98	538.40	535.96	7.3	16.9	17.5	NM	NM	5.07	533.33	6.00	529.96	2001	OVB	9.6	4.0
MW648		15022428.25	1319438.13	546.77	544.17	7.3	16.8	17.4	NM	NM	4.28	542.49	13.50	530.67	2001	OVB	9.6	4.0
MW649		15021299.49	1318723.15	543.10	540.49	7.0	16.6	17.2	NM	NM	4.17	538.93	7.50	532.99	2001	OVB	9.6	4.0
MW111	M3	15028902.95	1318551.57	531.80	529.40	10.5	54.0	UNKNOWN	NM	NM	6.58	525.22	10.00	519.40	1981	BRK	43.5	4.0
MW112		15030353.67	1318557.88	534.10	531.70	7.2	27.2	UNKNOWN	NM	NM	3.64	530.46	8.00	523.70	1981	BRK	20.0	4.0
MW113		15030379.46	1319676.13	536.32	533.70	7.2	27.2	UNKNOWN	NM	NM	4.28	532.04	5.00	528.70	1981	BRK	20.0	4.0
MW154		15027749.55	1318572.52	533.06	529.15	5.5	9.1	UNKNOWN	NM	NM	8.55	524.51	8.00	521.15	1982	BRK	3.6	UNKNOWN
MW203		15029235.44	1318551.15	534.23	532.02	10.5	25.5	UNKNOWN	NM	NM	5.46	528.77	5.50	526.52	1988	BRK	15.0	4.0
MW232		15030123.95	1318974.36	535.79	533.38	20.0	35.0	UNKNOWN	NM	NM	5.31	530.48	7.00	526.38	1988	BRK	15.0	4.0
MW233		15029737.88	1319024.94	535.58	532.96	10.0	25.0	UNKNOWN	NM	NM	4.02	531.56	2.50	530.46	1988	BRK	15.0	4.0
MW348		15029911.26	1318978.02	535.71	532.61	16.5	31.5	UNKNOWN	NM	NM	3.78	531.93	3.00	529.61	1991	BRK	15.0	4.0
MW352		15029602.85	1318617.32	534.89	532.33	19.0	34.0	UNKNOWN	NM	NM	6.10	528.79	6.00	526.33	1991	BRK	15.0	4.0
MW353		15030120.63	1318562.29	534.64	531.86	17.0	32.0	UNKNOWN	NM	NM	2.72	531.92	2.00	529.86	1991	BRK	15.0	4.0
MW115	MFG (M4)	15032589.49	1318485.27	533.40	530.80	7.2	27.2	UNKNOWN	NM	NM	5.53	527.87	2.00	528.80	1981	BRK	20.0	4.0
MW157		15032947.33	1319827.02	535.02	531.37	3.7	10.2	UNKNOWN	NM	NM	4.17	530.85	11.00	520.37	1982	COMBO	6.5	2.0
MW158		15032970.89	1319820.01	534.40	531.58	9.0	29.5	31.9	NM	NM	3.19	531.21	5.00	526.58	1982	BRK	20.5	3.0
MW114R	MFG (M5)	15031315.26	1323651.56	556.80	554.9	6.5	21.5	22.0	NM	NM	9.87	546.93	15.00	539.90	2001	COMBO	15.0	4.0
MW127R		15032537.25	1326273.84	596.04	592.9	30.0	45.0	46.0	NM	NM	42.51	553.53	40.00	552.90	2001	COMBO	15.0	4.0
MW207R		15032188.92	1323779.72	560.21	557.5	7.0	17.0	18.0	NM	NM	11.43	548.78	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
MW354R		15031780.18	1323424.19	559.61	557.6	7.0	17.0	18.0	NM	NM	12.78	546.83	19.00	538.60	2001	COMBO	10.0	4.0
MW355R		15030827.10	1323676.76	558.12	555.7	10.0	20.0	22.0	NM	NM	11.13	546.99	15.00	540.70	2001	COMBO	10.0	4.0
MW356R		15031372.45	1322053.98	558.08	556.1	24.5	34.5	35.0	NM	NM	13.15	544.93	20.00	536.10	2001	BRK	10.0	4.0
MW117	MFG (M6)	15036450.18	1318407.67	529.10	526.90	7.7	27.7	UNKNOWN	NM	NM	4.42	524.68	12.00	514.90	1981	COMBO	20.0	4.0
MW122		15038443.33	1321304.96	540.10	537.40	7.0	27.0	UNKNOWN	NM	NM	4.27	535.83	6.50	530.90	1981	BRK	20.0	4.0
MW123R		15035314.93	1320626.07	537.22	534.9	15.0	30.0	32.0	NM	NM	5.07	532.15	10.00	524.90	2001	BRK	15.0	4.0
MW125R		15037201.55	1322981.58	567.69	565.1	12.0	32.0	33.0	NM	NM	14.35	553.34	26.00	539.10	2001	COMBO	20.0	4.0
MW160		15034274.88	1321203.86	542.29	538.20	3.3	6.3	10.4	NM	NM	6.67	535.62	6.00	532.20	1982	OVB	3.0	2.0
MW162R		15035325.72	1320625.78	540.19	537.7	4.5	9.5	10.0	NM	NM	4.94	535.25	UNKNOWN	UNKNOWN	2001	OVB	5.0	4.0
MW164		15037035.66	1321868.53	545.21	541.69	3.0	6.0	9.7	NM	NM	6.38	538.83	6.00	535.69	1982	OVB	3.0	4.0
MW165		15037644.18	1321700.33	544.01	540.31	2.8	5.3	9.0	NM	NM	5.13	538.88	5.00	535.31	1982	OVB	2.5	4.0
MW166R		15039129.45	1322674.99	558.21	555.6	10.0	20.0	21.0	NM	NM	13.22	544.99	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
MW208		15035028.45	1320126.91	538.38	535.10	12.0	27.0	30.1	NM	NM	4.67	533.71	4.00	531.10	1988	BRK	15.0	4.0
MW209		15037473.35	1320271.28	537.75	534.89	19.5	34.5	UNKNOWN	NM	NM	3.18	534.57	11.10	523.79	1988	BRK	15.0	4.0
MW210R		15035465.00	1322154.00	565.83	564.30	10.7	20.0	20.0	NM	NM	10.46	555.37	UNKNOWN	UNKNOWN	1998	OVB	10.0	4.0
MW212R		15035415.00	1321862.00	567.74	565.30	9.5	19.5	21.0	NM	NM	14.59	553.15	UNKNOWN	UNKNOWN	1998	OVB	10.0	4.0
MW213R		15035462.00	1322159.00	566.49	564.30	38.0	53.0	54.0	NM	NM	19.68	546.81	30.50	533.80	1998	BRK	15.0	4.0

Table 2-2

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Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water January 2013 (TOC)	Water Elevation January 2013 (MSL)	Depth to Water April 2013 (TOC)	Water Elevation April 2013 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW215R	MFG (M6)	15035410.00	1321863.00	567.27	565.30	38.5	53.5	54.5	NM	NM	21.36	545.91	30.00	535.30	1998	BRK	15.0	4.0
MW307		15033821.00	1321855.79	563.56	561.45	17.0	27.0	31.7	NM	NM	19.54	544.02	UNKNOWN	UNKNOWN	1991	OVB	10.0	4.0
MW308		15033810.75	1321837.62	563.84	561.38	50.5	65.5	71.8	NM	NM	21.45	542.39	35.00	526.38	1991	BRK	15.0	4.0
MW309		15034826.80	1321825.25	565.59	563.43	12.7	27.7	30.6	NM	NM	11.00	554.59	30.00	533.43	1991	OVB	15.0	4.0
MW310R		15034823.00	1321824.00	565.17	563.00	44.5	59.5	60.0	NM	NM	22.17	543.00	31.00	532.00	1998	BRK	15.0	4.0
MW311	MFG (M6)	15038100.41	1322342.54	548.85	546.36	14.0	24.0	26.4	NM	NM	1.34	547.51	7.00	539.36	1991	BRK	10.0	4.0
MW312		15038100.56	1322332.55	548.59	545.96	40.0	55.0	58.1	NM	NM	1.07	547.52	7.00	538.96	1991	BRK	15.0	4.0
MW313		15037051.68	1321933.96	551.07	549.20	25.0	40.0	40.9	NM	NM	11.85	539.22	12.00	537.20	1991	BRK	15.0	4.0
MW314		15034383.61	1321451.49	542.32	539.53	9.7	14.7	17.8	NM	NM	6.83	535.49	7.20	532.33	1991	BRK	5.0	4.0
MW315		15034394.61	1321451.65	541.60	538.91	29.7	44.7	47.9	NM	NM	6.11	535.49	6.50	532.41	1991	BRK	15.0	4.0
MW316		15036232.25	1321257.09	542.89	540.49	13.0	18.0	20.9	NM	NM	6.22	536.67	7.50	532.99	1991	BRK	5.0	4.0
MW317		15036222.43	1321257.70	542.96	540.71	34.0	49.0	UNKNOWN	NM	NM	6.73	536.23	8.00	532.71	1991	BRK	15.0	4.0
MW318		15037189.67	1321488.64	547.67	545.23	11.8	21.8	24.2	NM	NM	10.01	537.66	11.50	533.73	1991	BRK	10.0	4.0
MW319		15037202.65	1321489.84	548.10	545.49	40.0	55.0	57.0	NM	NM	10.25	537.85	12.00	533.49	1991	BRK	15.0	4.0
MW320R		15039129.65	1322656.01	557.09	554.6	30.5	45.5	46.0	NM	NM	11.99	545.10	UNKNOWN	UNKNOWN	2001	OVB	15.0	4.0
MW650		15037950.23	1322587.98	566.45	563.83	12.0	22.0	22.5	NM	NM	10.73	555.72	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
MW651		15037939.17	1322583.70	566.88	563.83	36.0	46.0	47.0	NM	NM	18.29	548.59	23.00	560.83	1999	BRK	10.0	4.0
MW652		15037004.90	1322243.13	565.03	561.93	11.0	21.0	22.0	NM	NM	11.31	553.72	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
MW653		15036994.58	1322239.14	564.60	561.93	36.0	46.0	47.0	NM	NM	17.88	546.72	25.00	536.93	1999	BRK	10.0	4.0
MW654		15037070.77	1321976.938.79	551.15	548.49	13.0	23.0	24.0	NM	NM	12.33	538.82	10.50	539.00	1999	BRK	10.0	4.0
MW655		15034232.30	1320633.23	540.19	537.71	UNKNOWN	UNKNOWN	UNKNOWN	NM	NM	6.60	533.59	5.00	532.70	1999	BRK	UNKNOWN	4.0
MW662		15039862.64	1321841.47	547.56	UNKNOWN	6.0	16.0	18.0	NM	NM	7.85	539.71	20.00	UNKNOWN	2001	OVB	10.0	4.0
MW663		15039854.92	1321841.41	547.86	UNKNOWN	30.0	40.0	41.0	NM	NM	8.12	539.74	20.00	UNKNOWN	2001	BRK	10.0	4.0
MW664		15040136.57	1322326.42	547.43	UNKNOWN	5.0	10.0	10.5	NM	NM	7.85	539.58	10.00	UNKNOWN	2001	OVB	5.0	4.0
MW665		15040145.71	1322327.45	546.98	UNKNOWN	28.0	38.0	40.0	NM	NM	4.41	542.57	10.00	UNKNOWN	2001	BRK	10.0	4.0
MW124R	MFG (M7)	15033133.00	1320756.00	537.25	534.70	6.0	16.0	16.0	NM	NM	2.30	534.95	5.00	UNKNOWN	1998	BRK	10.0	4.0
MW156		15032408.65	1321713.49	541.35	537.45	1.7	5.2	UNKNOWN	NM	NM	5.64	535.71	5.30	532.15	1982	OVB	3.5	4.0
MW159		15033457.92	1320537.11	537.80	533.54	4.4	9.4	12.8	NM	NM	5.33	532.47	5.70	527.84	1982	COMBO	5.0	4.0
MW216		15033525.60	1320650.62	538.03	536.51	5.0	10.0	36.7	NM	NM	5.62	532.41	11.00	525.51	1988	OVB	5.0	4.0
MW217		15033449.66	1320652.62	538.97	536.90	19.5	34.5	12.0	NM	NM	5.63	533.34	13.40	523.50	1988	BRK	15.0	4.0
MW321		15033167.53	1321626.52	545.55	542.93	13.5	23.5	26.6	NM	NM	7.16	538.39	9.50	533.43	1991	BRK	10.0	4.0
MW322		15033161.04	1321640.23	544.54	542.26	34.5	49.5	51.5	NM	NM	10.02	534.52	9.00	533.26	1991	BRK	15.0	4.0
MW660		15032597.24	1320677.38	539.73	537.08	7.0	12.0	12.6	NM	NM	5.44	534.29	UNKNOWN	UNKNOWN	1999	OVB	5.0	4.0
MW661		15032587.16	1320679.22	539.57	537.09	20.0	30.0	30.0	NM	NM	6.46	533.11	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
MW147R	MFG (M8)	15037926.87	1323318.04	567.82	564.0	6.5	21.5	22.0	NM	NM	10.73	557.09	UNKNOWN	UNKNOWN	2001	OVB	15.0	4.0
MW148R		15038954.52	1323542.19	561.59	560.7	8.0	23.0	23.5	NM	NM	15.71	545.88	18.00	542.70	2001	COMBO	15.0	4.0
MW323R		15036514.75	1323739.67	566.00	563.5	8.0	18.0	18.5	NM	NM	17.30	548.70	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
MW324R		15038125.44	1323502.88	566.23	562.7	9.5	19.5	20.0	NM	NM	14.33	551.90	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
MW325R		15036105.38	1322633.31	569.62	566.9	7.0	17.0	18.0	NM	NM	13.25	556.37	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
MW327R	MFG (M9)	15035974.93	1324366.55	565.27	562.57	13.5	18.5	19.0	NM	NM	NM	NM	17.00	UNKNOWN	2001	COMBO	5.0	4.0
MW121		15040140.83	1323725.54	575.75	572.50	10.0	30.0	14.2	NM	NM	18.99	556.76	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
MW328		15040352.78	1323793.00	582.93	580.72	18.0	28.0	19.7	NM	NM	24.87	558.06	UNKNOWN	UNKNOWN	1991	OVB	10.0	4.0
MW330	MFG (Other Areas)	15040218.36	1323970.19	580.33	578.20	15.0	25.0	17.0	NM	NM	22.69	557.64	UNKNOWN	UNKNOWN	1991	OVB	10.0	4.0
MW116		15034538.62	1318460.26	535.20	532.60	7.0	27.0	UNKNOWN	NM	NM	3.45	531.75	5.00	527.60	1981	BRK	20.0	4.0
MW118		15039343.51	1318362.19	534.00	531.20	8.0	23.0	UNKNOWN	NM	NM	3.28	530.72	2.50	528.70	1981	BRK	15.0	4.0
MW119		15040962.12	1320127.86	538.90	535.50	3.3	23.3	UNKNOWN	NM	NM	5.88	533.02	6.00	529.50	1981	BRK	20.0	4.0
MW108		15025248.13	1320261.16	543.60	540.80	7.0	27.0	UNKNOWN	NM	NM	NM	NM	9.00	531.80	1981	BRK	20.0	4.0
MW333		15026529.41	1319776.92	536.41	533.63	17.9	32.9	UNKNOWN	NM	NM	NM	NM	5.00	528.63	1991	BRK	15.0	4.0
MW334		15025998.41	1319521.79	536.22	533.40	19.0	34.0	UNKNOWN	NM	NM	NM	NM	5.00	528.40	1991	BRK	15.0	4.0
MW335		15025671.86	1319364.79	538.36	535.66	9.4	19.4	UNKNOWN	NM	NM	NM	NM	6.00	529.66	1991	BRK	10.0	4.0
MW336	MFG (M11)	15025322.08	1319223.43	537.28	534.79	12.0	22.0	UNKNOWN	NM	NM	NM	NM	7.50	527.29	1991	BRK	10.0	4.0
MW337		15024991.97	1319103.37	536.96	534.32	21.1	36.1	UNKNOWN	NM	NM	NM	NM	6.50	527.82	1991	BRK	15.0	4.0

Table 2-2

Monitoring Well Information Table - Manufacturing Area
2013 Semi-Annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water January 2013 (TOC)	Water Elevation January 2013 (MSL)	Depth to Water April 2013 (TOC)	Water Elevation April 2013 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW338	M11	15024414.06	1318777.52	537.73	534.70	13.5	28.5	UNKNOWN	NM	NM	NM	NM	3.00	531.70	1991	BRK	15.0	4.0
MW339		15023897.93	1318660.60	541.27	538.41	9.7	19.7	UNKNOWN	NM	NM	NM	NM	9.00	529.41	1991	BRK	10.0	4.0
MW340		15023157.68	1318683.22	542.47	539.83	7.0	17.0	UNKNOWN	NM	NM	NM	NM	10.00	529.83	1991	COMBO	10.0	4.0
MW802		15025690.00	1320235.70	543.42	541.62	5.0	15.0	15.0	NM	NM	NM	NM	9.50	532.12	2008	COMBO	10.0	4.0
MW803		15025697.70	1320237.50	543.66	541.56	26.5	36.5	36.5	NM	NM	NM	NM	9.50	532.06	2008	BRK	10.0	4.0
MW804		15025916.10	1319219.30	536.48	533.78	5.0	15.0	15.0	NM	NM	NM	NM	3.50	530.28	2008	COMBO	10.0	4.0
MW805		15025913.60	1319229.60	536.27	533.62	25.0	35.0	35.0	NM	NM	NM	NM	3.50	530.12	2008	BRK	10.0	4.0
AEHA14R	M13	15034927.28	1322519.89	569.73	567.03	16.5	26.5	27.0	15.74	553.99	17.71	552.02	UNKNOWN	UNKNOWN	2001	OVB	10.0	4.0
AEHA15		15034695.41	1322493.87	570.38	567.32	UNKNOWN	UNKNOWN	36.5	20.92	549.46	20.23	550.15			UNKNOWN	OVB	UNKNOWN	2.0
MW126R		15034092.63	1323332.31	562.41	563.00	11.0	21.0	22.0	16.03	546.38	15.34	547.07	UNKNOWN	UNKNOWN	2004	OVB	10.0	4.0
MW350		15032810.11	1321811.02	554.34	552.34	12.5	22.5	24.8	15.87	538.47	15.03	539.31	19.00	533.34	1991	COMBO	10.0	4.0
MW362		15034100.64	1323339.44	562.46	562.78	28.0	33.0	34.0	13.59	548.87	13.37	549.09	29.50	533.28	2004	BRK	5.0	4.0
MW363		15032768.31	1322536.05	570.03	567.66	21.0	31.0	32.0	28.06	541.97	27.52	542.51	31.50	536.16	2004	OVB	10.0	4.0
MW364		15032775.38	1322527.16	569.82	567.69	37.0	42.0	42.5	27.63	542.19	27.17	542.65	31.50	536.19	2004	BRK	5.0	4.0
MW806		15034807.20	1323337.90	565.53	UNKNOWN	15.0	25.0	25.0	14.68	550.85	14.31	551.22	29.00	UNKNOWN	2008	OVB	10.0	4.0
MW807		15034817.40	1323338.10	565.79	UNKNOWN	35.0	45.0	45.0	16.28	549.51	15.78	550.01	29.00	UNKNOWN	2008	BRK	10.0	4.0
MW808		15034539.90	1322493.10	569.23	UNKNOWN	15.0	25.0	25.0	16.00	553.23	16.50	552.73	30.00	UNKNOWN	2008	OVB	10.0	4.0
MW809		15034530.20	1322492.90	569.18	UNKNOWN	35.0	45.0	45.0	20.40	548.78	19.88	549.30	30.00	UNKNOWN	2008	BRK	10.0	4.0

Notes:
Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)
UNKOWN = Indicates data not presented on borelogs or provided in RI/FS documentation.
NM = Water level not measured.
BRK = Bedrock
OVB = Overburden
COMBO = Combination Overburden and Bedrock Well
MSL = Feet Relative to Mean Seal Level
BGS = Feet Below Ground Surface
ID = Identification
TOC = Top of Casing

Table 2-3

Monitoring Well Information Table - LAP Area
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water April 2013 (TOC)	Water Elevation April 2013 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW131	L1	15029483.20	1344039.100	625.01	622.29	2.5	22.5	24.0	14.82	610.19	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
MW171		15028774.67	1343406.032	618.24	615.03	2.9	7.9	11.1	10.73	607.51	8.00	607.03	1982	OVB	5.0	4.0
MW172		15028836.84	1344094.147	615.87	613.19	14.5	34.5	37.5	8.82	607.05	11.00	602.19	1982	BRK	20.0	4.0
MW173		15028827.26	1344123.204	615.56	612.56	2.8	11.8	15.2	8.55	607.01	12.00	600.56	1982	OVB	9.0	3.6
MW174		15028974.94	1344649.467	615.32	612.40	3.5	14.5	18.1	8.41	606.91	15.00	597.40	1982	OVB	11.0	3.6
MW175		15029420.69	1343046.596	634.45	630.96	3.7	19.7	23.2	13.91	620.54	20.00	610.96	1982	OVB	16.0	3.6
MW176		15030320.57	1343491.565	646.77	643.49	4.8	20.8	23.6	21.41	625.36	20.80	622.69	1982	OVB	16.0	3.6
MW177		15028773.31	1343380.183	616.29	613.84	11.8	31.0	33.4	7.64	608.65	6.50	607.34	1983	BRK	19.2	3.0
MW178		15030330.01	1343512.024	643.83	640.39	27.3	46.5	50.1	25.68	618.15	20.00	620.39	1983	BRK	19.2	3.0
MW400		15030872.22	1344840.211	655.17	652.56	16.2	26.2	28.6	NM	NM	21.00	631.56	1991	COMBO	10.0	4.0
MW401		15028228.22	1344007.476	611.96	610.20	28.5	43.5	46.1	6.55	605.41	16.00	594.20	1991	BRK	15.0	4.0
WES1		15029404.21	1343978.508	623.13	621.43	20.0	40.0	40.0	13.25	609.88	20.00	601.43	1997	BRK	20.0	4.0
WES2		15029874.92	1343699.213	637.69	635.98	22.0	42.0	42.0	23.57	614.12	22.00	613.98	1997	BRK	20.0	4.0
WES3		15028686.71	1344093.581	611.69	610.33	20.0	40.0	40.0	4.92	606.77	20.00	590.33	1997	BRK	20.0	4.0
MW610		15028213.06	1344005.102	612.63	609.62	4.0	14.0	14.0	7.15	605.48	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
MW611		15027976.15	1344327.569	620.45	617.83	10.0	20.0	21.0	8.73	611.72	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
MW132	L2	15026868.16	1339653.570	612.30	609.84	7.5	27.5	29.4	NM	NM	18.00	591.84	1981	COMBO	20.0	4.0
MW133		15026726.48	1338362.506	605.88	603.51	7.2	27.2	28.7	NM	NM	19.50	584.01	1981	COMBO	20.0	4.0
MW134		15025646.63	1338233.841	613.30	609.70	6.7	26.7	27.1	6.82	606.48	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
MW135		15025761.10	1339631.781	637.35	634.18	6.0	26.0	27.0	NM	NM	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
MW404		15026798.76	1338548.502	605.88	604.09	7.7	17.7	20.5	NM	NM	12.00	592.09	1991	COMBO	10.0	4.0
MW405		15027072.91	1338771.791	607.21	605.16	10.8	20.8	23.5	NM	NM	16.00	589.16	1991	COMBO	10.0	4.0
MW406		15026560.78	1339282.341	623.13	620.72	23.8	33.8	35.7	NM	NM	29.00	591.72	1991	COMBO	10.0	4.0
MW407		15026676.15	1339269.053	620.05	618.30	20.5	30.5	33.9	NM	NM	25.50	592.80	1991	COMBO	10.0	4.0
MW501		15025985.85	1338411.03	617.05	614.72	12.7	22.7	NA	NM	NM	25.00	589.72	1991	OVB	10.0	4.0
MW620		15027048.61	1338602.438	605.07	602.41	7.0	17.0	18.0	NM	NM	UNKNOWN	UNKNOWN	1999	OVB	10.0	4.0
MW621		15027058.70	1338599.038	604.96	602.41	22.0	32.0	32.8	NM	NM	20.00	582.41	1999	BRK	10.0	4.0
MW810		15027142.71	1338476.770	604.58	601.91	7.0	17.3	18.0	NM	NM	UNKNOWN	UNKNOWN	2009	OVB	10.0	4.0

Table 2-3

Monitoring Well Information Table - LAP Area
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water April 2013 (TOC)	Water Elevation April 2013 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW1	L3	15025237.01	1338193.456	630.63	628.68	16.5	26.5	27.8	18.04	612.59	UNKNOWN	UNKNOWN	1986	OVB	10.0	2.0
MW136		15024523.06	1337305.702	602.70	600.8	7.2	27.2	NA	6.02	596.68	11.00	589.80	1981	COMBO	20.0	4.0
MW137		15024661.00	1338608.636	632.90	631.40	7.0	27.0	28.7	9.74	623.16	UNKNOWN	UNKNOWN	1981	OVB	20.0	4.0
MW3		15025504.29	1337801.715	610.34	608.50	9.0	19.0	20.9	3.98	606.36	19.00	589.50	1986	OVB	10.0	2.0
MW410		15025282.41	1337409.613	604.38	NA	8.0	18.0	20.3	12.16	592.22	UNKNOWN	UNKNOWN	1993	OVB	10.0	4.0
MW411		15024977.88	1337383.946	616.71	NA	13.0	23.0	25.1	18.02	598.69	18.00	594.54	1991	COMBO	10.0	4.0
MW412		15024596.02	1337101.399	599.14	597.41	7.4	17.4	19.2	4.46	594.68	3.00	594.41	1991	BRK	10.0	4.0
MW630	L3	15024770.15	1337013.674	595.06	592.23	7.0	12.0	12.7	16.31	578.75	4.00	588.20	1999	BRK	5.0	4.0
MW631		15024764.63	1337010.736	595.09	592.23	16.0	26.0	27.0	4.40	590.69	4.00	588.20	1999	BRK	10.0	4.0
MW632		15024828.58	1336912.350	606.25	603.75	12.0	27.2	27.5	6.76	599.49	UNKNOWN	UNKNOWN	2009	BRK	15.0	4.0
MW633		15024474.50	1336978.448	600.37	597.90	7.0	17.0	18.0	5.43	594.94	5.00	592.90	1999	BRK	10.0	4.0
H-7	L14	15019448.58	1332662.795	584.62	581.45	4.0	14.0	15.5	NM	NM	12.00	569.45	1982	OVB	10.0	2.0
H-8		15019409.64	1333457.292	591.40	588.14	7.0	22.0	22.9	NM	NM	20.00	568.14	1982	OVB	15.0	2.0
MW140		15018819.68	1332901.750	584.59	581.68	7.0	27.0	30.3	NM	NM	22.00	559.68	1981	COMBO	20.0	4.0
MW508		15019632.37	1333106.169	587.44	585.34	10.0	20.0	22.9	NM	NM	UNKNOWN	UNKNOWN	1993	OVB	10.0	4.0
MW511		15019645.92	1333029.631	587.45	584.98	4.0	14.0	17.0	NM	NM	16.00	568.98	1997	OVB	10.0	4.0
MW512		15019541.13	1333111.131	588.04	585.98	5.0	15.0	18.2	NM	NM	16.00	569.98	1997	OVB	10.0	4.0
MW600		15019920.13	1332928.643	587.22	584.75	6.0	11.0	11.0	NM	NM	11.00	573.75	1998	OVB	5.0	2.0
MW601		15019196.31	1333121.302	586.72	584.29	9.0	19.0	20.0	NM	NM	19.60	564.69	1998	OVB	10.0	2.0
MW602		15019432.73	1332663.469	583.83	581.22	21.0	31.0	31.0	NM	NM	12.00	569.20	1999	BRK	10.0	4.0
MW603		15019323.75	1332379.579	580.77	578.27	6.0	16.0	16.0	NM	NM	13.00	565.30	1999	OVB	10.0	4.0
MW604		15019335.87	1332379.437	581.12	578.27	20.0	30.0	31.0	NM	NM	13.00	565.30	1999	BRK	10.0	4.0

General Notes

Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)

UNKNOWN = Indicate data not presented on borelogs or provided in RI/FS documentation.

NM = Water level not measured.

BRK = Bedrock

OVB = Overburden

COMBO = Combination Overburden and Bedrock Well

MSL = Feet Relative to Mean Seal Level

BGS = Feet Below Ground Surface

ID = Identification

TOC = Top of Casing

Table 2-4

**Surface Water Elevations
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

Site	Surface Water Location	Surface Water Elevation	
		Date	ft (MSL)
L1	SW550	4/8/2013	606.85
L2	SW555	NM	NM
L3	SW557	4/8/2013	582.96
	SW558	4/8/2013	595.61
	SW777	NM	NM
	SW004	4/8/2013	591.07
M1	SW709	4/11/2012	534.59

Notes:

ft = Feet

MSL = Mean Sea Level

NM - Not Measured

Table 3-1

Summary of Analytical Results - Explosives
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit ⁽¹⁾		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
L1	In-Plume																													
	MW131	4/13/2013	<0.37	U / UJ	<0.37	U / UJ	<0.18	U / UJ	40	/ J	55	/ J	<0.37	U / UJ	<0.37	U / UJ	<0.37	U / UJ	<0.37	U / UJ	<0.92	U / UJ	<0.18	U / UJ	<0.22	U / UJ	3100	/ J	4200	/ J
	WES1	4/13/2013	<0.4	U / UJ	<0.4	U / UJ	0.29	/ JJ	10	/ J	12	/ J	<0.4	U / UJ	0.11	F / JJ	<0.4	U / UJ	<0.4	U / UJ	<1	U / UJ	<0.2	U / UJ	<0.24	U / UJ	16	F / J	25	/ J
	MW173	4/13/2013	<0.37		<0.37		<0.18		1.3		1	/ J	0.22	F / J	<0.37		<0.37		<0.37		<0.92		1.6	/ J	<0.22		<0.92		0.56	
	MW173 (DUP)	4/13/2013	<0.38		<0.38		<0.19		1.5		1.2	/ J	0.25	F / J	<0.38		<0.38		<0.38		<0.94		1.7	/ J	<0.23		<0.94		0.53	
	Early Warning																													
	MW174	4/13/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	WES3	4/13/2013	<0.37	U / UJ	<0.37	U / UJ	<0.18	U / UJ	0.29	/ J	0.3	/ J	<0.37	U / UJ	<0.37	U / UJ	<0.37	U / UJ	<0.37	U / UJ	<0.91	U / UJ	0.11	F / J	<0.22	U / UJ	<0.91	U / UJ	0.23	F / J
	Compliance																													
	SW550	4/14/2013	<0.42		<0.42		<0.21		<0.21		<0.21		<0.42		<0.42		<0.42		<0.42		<1.1		<0.21		<0.25		<1.1		<0.42	
L3	Upgradient																													
	SW004	4/16/2013	<0.71		<0.71		<0.35		<0.35		<0.35		<0.71		<0.71		<0.71		<0.71		<1.8		<0.35		<0.42		<1.8		<0.71	
	In-Plume/Downgradient																													
	MW410	4/16/2013	<0.39		<0.39		<0.2		<0.2		<0.2		<0.39	U / Q	<0.39	U / Q	<0.39	U / Q	<0.39		<0.99	U / Q	<0.2		<0.24		<0.99		<0.39	
	MW412	4/15/2013	<0.39	U / UJ	<0.39	U / UJ	<0.19	U / UJ	0.38	/ JJ	0.51	/ JJ	20	/ JJQ	<0.39	U / UJQ	<0.39	U / UJQ	<0.39	U / UJ	<0.97	U / UJQ	74	/ JJ	<0.23	U / UJ	<0.97	U / UJ	<0.39	U / UJ
	Early Warning/Downgradient																													
	MW630	4/16/2013	<0.39		<0.39		<0.19		0.1	F / J	0.17	F / J	4.5	/ Q	<0.39	U / Q	<0.39	U / Q	<0.39	U / Q	<0.97	U / Q	6.1		<0.23		<0.97		<0.39	
	MW631	4/16/2013	<0.39		<0.39		<0.19		<0.19		<0.19		<0.39	U / Q	<0.39	U / Q	<0.39	U / Q	<0.39	U / Q	<0.96	U / Q	<0.19		<0.23		<0.96		<0.39	
	MW633	4/15/2013	<0.38	U / UJ	<0.38	U / UJ	<0.19	U / UJ	<0.19	U / UJ	<0.19	U / UJ	0.43	/ JQ	<0.38	U / UJQ	<0.38	U / UJQ	<0.38	U / UJ	<0.94	U / UJQ	1.6	/ J	<0.23	U / UJ	<0.94	U / UJ	<0.38	U / UJ
	MW633 (DUP)	4/15/2013	<0.42		<0.42		<0.21		<0.21		<0.21		0.6	/ Q	<0.42	U / Q	<0.42	U / Q	<0.42		<1	U / Q	2.4		<0.25		<1		<0.42	
	Compliance/Downgradient																													
	SW777	4/16/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4	U / Q	<0.4	U / Q	<0.4	U / Q	<0.4		<1	U / Q	<0.2		<0.24		<1		<0.4	
	Downgradient																													
	SW557	4/16/2013	<0.68		<0.68		<0.34		<0.34		<0.34		<0.68		<0.68		<0.68		<0.68		<1.7		<0.34		<0.41		<1.7		<0.68	
	SW558	4/16/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4	U / Q	<0.4	U / Q	<0.4	U / Q	<0.4		<1	U / Q	<0.2		<0.24		<1		<0.4	
M6	In-Plume																													
	MW212R	4/11/2013	10	/ J	1500	/ J	440	/ J	37	F / JJ	56	/ J	<0.38	U / UJ	3.4	/ J	<0.38	U / UJ	370	/ J	2400	/ J	0.18	F / J	<0.23	U / UJ	1.6	/ J	140	/ J
	MW212R (DUP)	4/11/2013	1.9	/ J	1400	/ J	430	/ J	30	F / JJ	49	/ J	<0.37	U / UJ	2.4	/ J	500	/ J	370	/ J	2400	/ J	0.17	F / J	<0.22	U / UJ	2.3	/ J	150	
	MW652	4/10/2013	1.8	/ JJ	1700	/ J	480	/ J	33	/ J	71	/ JJ	<0.41	U / UJ	4.3	/ JJ	7800	/ J	760	/ J	5100	/ J	0.48	/ JJ	<0.24	U / UJ	3	/ J	270	F / J

Table 3-1

Summary of Analytical Results - Explosives
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Compound		1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		HMX		NB		2-NT		3-NT		4-NT		RDX		Tetryl		1,3,5-TNB		2,4,6-TNT	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit ⁽¹⁾		10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
	Surface Water RG		4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M6	Early Warning																													
	MW123R	4/10/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	MW162R	4/10/2013	<0.41		<0.41		<0.2		<0.2		<0.2		<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.24		<1		<0.41	U / UJ
	MW313	4/11/2013	<0.36		<0.36		<0.18		<0.18		<0.18		<0.36		<0.36		<0.36		<0.36		<0.91		0.061	F / J	<0.22		<0.91		<0.36	
	MW318	4/10/2013	<0.37	U / UJ	<0.37	U / UJ	0.79	/ J	<0.19	U / UJ	<0.19	U / UJ	16	/ JJ	<0.37	U / UJ	<0.37	U / UJ	<0.37	U / UJ	<0.94	U / UJ	<0.19	U / UJ	<0.22	U / UJ	2.4	/ JJ	<0.37	U / UJ
	MW319	4/10/2013	<0.4		<0.4		<0.2		6.2		<0.2		57	/ JJ	<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	MW654	4/11/2013	<0.38	U / UJ	0.085	F / JJ	0.11	F / JJ	0.76	/ J	0.82	/ JJ	<0.38	U / UJ	<0.38	U / UJ	0.23	F / J	<0.38	U / UJ	<0.95	U / UJ	0.15	F / JJ	<0.23	U / UJ	0.32	F / JJ	<0.38	U / UJ
M7	MW124R	4/10/2013	<0.41	U / UJ	<0.41	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<1	U / UJ	<0.2	U / UJ	<0.24	U / UJ	<1	U / UJ	<0.41	U / UJ
Other Areas	Compliance																													
	MW117	4/10/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	MW118	4/10/2013	<0.41		<0.41		<0.21		<0.21		<0.21		<0.41		<0.41		<0.41		<0.41		<1		<0.21		<0.25		<1		<0.41	
	MW119	4/10/2013	<0.41		<0.41		<0.2		<0.2		<0.2		<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.25		<1		<0.41	
M13	Upgradient																													
	MW806	1/31/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	MW806 (DUP)	1/31/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	MW806	4/9/2013	<0.45		<0.45		<0.22		<0.22		<0.22		<0.45		<0.45		<0.45		<0.45		<1.1		<0.22		<0.27		<1.1		<0.45	
	MW807	1/31/2013	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24		<1		<0.4	
	MW807	4/9/2013	<0.41	U / UJ	<0.41	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<1	U / UJ	<0.2	U / UJ	<0.24	U / UJ	<1	U / UJ	<0.41	U / UJ
	Downgradient																													
	Downgradient																													
	MW126R	1/30/2013	<0.41		<0.41		<0.2		<0.2		<0.2		<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.24		<1		<0.41	
	MW126R	4/9/2013	<0.41	U / UJ	<0.41	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<1	U / UJ	<0.2	U / UJ	<0.24	U / UJ	<1	U / UJ	<0.41	U / UJ
	MW362	1/30/2013	<0.41	U / UJ	7.3	/ J	0.33	/ J	1.2	/ J	0.97	/ J	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<1	U / UJ	<0.21	U / UJ	<0.25	U / UJ	<1	U / UJ	<0.41	U / UJ
	MW362	4/9/2013	<0.4	U / UJ	3.9	/ J	0.26	/ JJ	0.82	/ JJ	0.61	/ JJ	<0.4	U / UJ	<0.4	U / UJ	<0.4	U / UJ	<0.4	U / UJ	<1	U / UJ	<0.2	U / UJ	<0.24	U / UJ	2.5	/ UJ	<0.4	U / UJ
	MW362 (DUP)	4/9/2013	<0.41		3.6		0.25	/ J	0.78		0.6	/ J	<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.24		2.4		<0.41	
	MW808	1/30/2013	<0.41		<0.41		<0.2		<0.2		<0.2		<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.24		<1		<0.41	
MW808	4/9/2013	<0.41	U / UJ	<0.41	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.2	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<0.41	U / UJ	<1	U / UJ	<0.2	U / UJ	<0.24	U / UJ	<1	U / UJ	<0.41	U / UJ	
MW809	1/30/2013	<0.41		0.1	F /	<0.2		<0.2		<0.2		<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.24		<1		<0.41		
MW809	4/9/2013	<0.43		<0.43		<0.21		<0.21		<0.21		<0.43		<0.43		<0.43		<0.43		<1.1		<0.21		<0.26		<1.1		<0.43		

Table 3-2

Summary of Analytical Results - Target Analyte List Metals
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	Analyte		Aluminum		Antimony		Arsenic		Barium		Cadmium		Calcium		Chromium		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Mercury		Nickel		Potassium		Silver		Sodium		Vanadium		Zinc		
	Units		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L				
	Project Action Limit ⁽¹⁾		100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		0.1		NS		10		NS		NS		0.511		NS		NS		NS		10		
	Surface Water RG		NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		0.064		NS		1.0		0.103		1.0		NS		0.005		NS		NS		1.0		
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	
L3	Upgradient																																										
	SW004	4/16/2013	0.1	F /	<0.02		<0.025		0.036		<0.005		60		<0.015		<0.015		0.0025	F /	0.13		<0.015		25		0.014		<0.0002		0.0014	F /	2.2	F /	<0.015		15		<0.015		<0.15		
	In-Plume/Downgradient																																										
	MW412	4/15/2013	<0.3		<0.02		<0.025		0.036		<0.005		79		<0.015		<0.015		<0.015		<0.1		<0.015		40		<0.01		<0.0002		<0.04		1.1	F /	<0.015		6.8		<0.015		<0.15		
	Early Warning/Downgradient																																										
	MW630	4/16/2013	<0.3		<0.02		<0.025		0.012		<0.005		84		<0.015		<0.015		<0.015		<0.1		<0.015		42		0.0043	F /	<0.0002		<0.04		4.3		<0.015		22		<0.015		<0.15		
	MW630 (DUP)	4/16/2013	<0.3		<0.02		<0.025		0.014		<0.005		68		<0.015		<0.015		<0.015		0.028	F /	<0.015		35		0.023		<0.0002		<0.04		5.2		<0.015		28		<0.015		<0.15		
	MW631	4/16/2013	<0.3		<0.02		<0.025		0.014		<0.005		68		<0.015		<0.015		<0.015		0.028	F /	<0.015		35		0.024		<0.0002		<0.04		5.2		<0.015		28		<0.015		<0.15		
	MW633	4/15/2013	0.44		<0.02		<0.025		0.039		<0.005		67		<0.015		<0.015		0.0017	F /	0.4		<0.015		30		0.0032	F /	<0.0002		<0.04		1	F /	<0.015		6.9		<0.015		<0.15		
	Compliance/Downgradient																																										
	SW777	4/16/2013	0.018	F /	<0.02		<0.025		0.035		<0.005		59		<0.015		<0.015		0.002	F /	0.034	F /	<0.015		24		0.011		<0.0002		0.0014	F /	1.9	F /	<0.015		14		<0.015		<0.15		
	Downgradient																																										
	SW557	4/16/2013	0.14	F /	<0.02		<0.025		0.035		<0.005		59		<0.015		<0.015		0.003	F /	0.16		<0.015		25		0.014		<0.0002		0.0014	F /	2	F /	<0.015		16		<0.015		<0.15		
	SW558	4/16/2013	0.051	F /	<0.02		<0.025		0.033		<0.005		49		<0.015		<0.015		0.0019	F /	0.064	F /	<0.015		20		0.0041	F /	<0.0002		<0.04		1.7	F /	<0.015		3.4	F /	<0.015		<0.15		
M13	Upgradient																																										
	MW806	1/31/2013	<0.3		<0.02		<0.025		0.095		0.00073	F /	76		<0.015		<0.015		<0.015		0.15		<0.015		45		0.0069	F /	<0.0002		<0.04		1.9	F /	<0.015		26		<0.015		<0.15		
	MW806 (DUP)	1/31/2013	<0.3		0.0039	F /	<0.025		0.098		0.00073	F /	78		<0.015		<0.015		<0.015		0.16		<0.015		46		0.0069	F /	<0.0002		<0.04		2.1	F /	<0.015		27		<0.015		<0.15		
	MW806	4/9/2013	<0.3		<0.02		<0.025		0.096		0.0006	F /	76		<0.015		<0.015		0.0027	F /	0.022	F /	<0.015		45		0.0046	F /	<0.0002		<0.04		2	F /	<0.015		28		0.0011	F /	<0.15		
	MW807	1/31/2013	<0.3		<0.02		<0.025		0.093		0.00092	F /	180		<0.015		<0.015		<0.015		0.41		<0.015		85		0.13		<0.0002		0.0031	F /	8		<0.015		420		0.0012	F /	<0.15		
	MW807	4/9/2013	<0.3		<0.02		<0.025		0.096		0.00078	F /	170		<0.015		<0.015		<0.015		0.34		<0.015		86		0.14		<0.0002		0.0033	F /	7.9		<0.015		440		0.0016	F /	<0.15		
	Downgradient																																										
	MW126R	1/30/2013	<0.3		<0.02		<0.025		0.058		<0.005		79		<0.015		<0.015		0.0017	F /	<0.1		<0.015		49		0.022		<0.0002		0.0018	F /	3.1		<0.015		50		<0.015		0.0066	F /	
	MW126R	4/9/2013	<0.3		<0.02		<0.025		0.053		0.00054	F /	68		<0.015		<0.015		<0.015		0.045	F /	<0.015		44		0.02		<0.0002		<0.04		2.4	F /	<0.015		29		<0.015		<0.15		
	MW362	1/30/2013	<0.3		<0.02		<0.025		0.051		<0.005		180		0.0007	F /	0.0012	F /	0.0022	F /	<0.1		<0.015		110		0.18		<0.0002		0.0065	F /	7.8		<0.015		320		<0.015		0.0046	F /	
	MW362	4/9/2013	<0.3		<0.02		<0.025		0.043		0.00071	F /	160		<0.015		0.0012	F /	0.0016	F /	<0.1		<0.015		93		0.069		<0.0002		0.0039	F /	6.5		<0.015		280		0.0015	F /	<0.15		
	MW362 (DUP)	4/9/2013	<0.3		<0.02		<0.025		0.043		0.00076	F /	150		<0.015		0.0012	F /	<0.015		<0.1		<0.015		94		0.069		<0.0002		0.0039	F /	6.6		<0.015		280		0.0017	F /	<0.15		
	MW808	1/30/2013	<0.3		<0.02		<0.025		0.23		0.0007	F /	170		<0.015		0.0079	F /	0.0048	F /	1.9		<0.015		88		0.85		<0.0002		0.023	F /	13		<0.015		66		0.0029	F /	0.0095	F /	
	MW808	4/9/2013	<0.3		<0.02		<0.025		0.072		0.00098	F /	220		<0.015		0.01	F /	0.002	F /	0.097	F /	<0.015		100		1.6		<0.0002		0.033	F /	14		<0.015		67		0.0077	F /	0.0045	F /	
	MW809	1/30/2013	<0.3		<0.02		<0.025		0.028		<0.005		42		<0.015		<0.015		<0.015		0.042	F /	<0.015		32		0.012		<0.0002		0.0013	F /	3.2		<0.015		21		<0.015		<0.15		
MW809	4/9/2013	<0.3		<0.02		<0.025		0.024		<0.005		41		<0.015		<0.015		<0.015		0.11		<0.015		30		0.014		<0.0002		<0.04		3.3		<0.015		23		<0.015		<0.15			

Table 3-3

Summary of Analytical Results - Indicator Parameters
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	Compound		Nitrate		Sulfate	
	Units		mg/L		mg/L	
	Project Action Limit ⁽¹⁾		10		400	
	Surface Water RG		NS		NS	
Site	Well	Date	Result	LF/VF	Result	LF/VF
M1	In-Plume					
	MW107	4/11/2013	NA		17,000	
	MW231	4/12/2013	NA		32,000	
	MW640	4/15/2013	NA		6,800	
	MW641	4/12/2013	NA		480	
	MW641 (DUP)	4/12/2013	NA		480	
	MW642	4/15/2013	NA		410	
	Early Warning					
	MW643	4/11/2013	NA		160	
	MW644	4/11/2013	NA		150	
	Compliance					
	MW645	4/11/2013	NA		100	
	MW646	4/11/2013	NA		110	
	MW648	4/11/2013	NA		13	
	MW649	4/11/2013	NA		190	
	SW709	4/11/2013	NA		59	
M8	In-Plume					
	MW330	4/10/2013	NA		530	
M13	Upgradient					
	MW806	1/31/2013	0.26	F /	78	
	MW806 (DUP)	1/31/2013	0.42	F /	79	
	MW806	4/9/2013	0.23	F /	80	
	MW807	1/31/2013	<1		260	
	MW807	4/9/2013	<1		230	
	Downgradient					
	MW126R	1/30/2013	0.072	F /	60	
	MW126R	4/9/2013	0.089	F /	56	
	MW362	1/30/2013	0.077	F /	280	
	MW362	4/9/2013	<0.5		260	
	MW362 (DUP)	4/9/2013	<0.5		260	
	MW808	1/30/2013	<0.5		130	
	MW808	4/9/2013	3.8		490	
	MW809	1/30/2013	<0.5		8.1	
	MW809	4/9/2013	0.091	F /	8.5	

Footnotes:
(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest 2010).
IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
Site M11 not sampled in spring
mg/L = milligrams per liter
< = Result shows laboratory Method Reporting Limit for non-detected results
Bolded result indicates Project Action Limit (RG) exceedance
DUP = Duplicate
NS = No Standard
NA = Not Analyzed
LF/VF = Lab Flag/Validation Flag
F = Concentration below the reported detection limit

Table 3-4

Summary of Analytical Results - Volatile Organic Compounds
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	Compound		Acetone		Benzene		Carbon disulfide		Chlorobenzene		Chloromethane		1,1-DCA		1,2-DCA		cis-1,2-DCE		Ethyl Benzene		MethCl		MEK		Naphthalene		PCE		Toluene		1,1,1-TCA		TCE		VC		Xylenes (total)			
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L			
	Project Action Limit(1)		NS		25		NS		500		NS		3500		25		200		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000			
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF		
M13	Upgradient																																							
	MW806	1/31/2013	<10	U / UJ	<1		<2		<1		<2		<1		<1		<1		<1		0.5	F /	<6	U / UJ	<1		<1		<1		<1		<1		<1.5		<1			
	MW806 (DUP)	1/31/2013	<10	U / UJ	<1		<2		<1		<2		<1		<1		<1		<1		0.57	F /	<6	U / UJ	<1		<1		<1		<1		<1		<1.5		<1			
	MW806	4/9/2013	<10	U / Q	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<1			
	MW807	1/31/2013	<10	U / UJ	<1		<2		<1		<2		1.9		<1		1.2		<1		0.52	F /	<6	U / UJ	<1		<1		<1		0.28	F /	0.28	F /	<1.5		<1			
	MW807	4/9/2013	<10	U / Q	<1		<2		<1		<2		1.5		<1		1.1		<1		<5		<6		<1		<1		<1		<1		0.22	F /	0.22	F /	<1.5		<1	
	Downgradient																																							
	MW126R	1/30/2013	<10		<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<1			
	MW126R	4/9/2013	<10	U / Q	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<1			
	MW362	1/30/2013	<10		<1		<2		<1		<2		0.42	F /	<1		<1		<1		<5		<6		<1		0.23	F /	<1		<1		<1		<1.5		<1			
	MW362	4/9/2013	<10		<1		<2		<1		<2		0.4	F /	<1		<1		<1		<5		<6		<1		0.26	F /	<1		<1		<1		<1.5		<1			
	MW362 (DUP)	4/9/2013	<10		<1		<2		<1		<2		0.39	F /	<1		<1		<1		<5		<6		<1		0.23	F /	<1		<1		<1		<1.5		<1			
	Downgradient																																							
	MW808	1/30/2013	7.3	F /	<1		<2		<1		<2		<1		<1		<1		<1		0.34	F /	<6		<1	U / UJ	<1		<1		<1		<1		<1		<1.5		<1	
	MW808	4/9/2013	<10	U / Q	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<1			
	MW809	1/30/2013	2.5	F /	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1	U / UJ	<1		<1		<1		<1		<1.5		<1			
	MW809	4/9/2013	<10	U / Q	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<1			

Footnotes:
(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the Long Term Monitoring Plan (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
Site M11 not sampled in spring
An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.
µg/L = Micrograms Per Liter
< = Result shows laboratory method reporting limit for non-detected results
Bolded result indicates Project Action Limit (RG) exceedance
DUP = Duplicate
NS = No Standard
1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
cis-1,2-DCE = cis-1,2-Dichloroethene

MEK = Methyl Ethyl Ketone (2-butanone)
MethCl = Methylene Chloride
PCE = Tetrachloroethene
TCE = Trichloroethene
VC = Vinyl chloride
LF/VF = Lab Flag/Validation Flag
Q = Laboratory Control Sample recovery lower than quality control limits
U = Not detected
UJ = Not detected, estimated detection limit
F = Concentration below the reported detection limit

Table 3-5

Summary of Analytical Results - Semivolatile Organic Compounds
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	Compound		2,4-DNT		2,6-DNT		Naphthalene		NB		2-Methylnaphthalene		Phenol	
	Units		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit ⁽¹⁾		0.42		0.42		NS		51		NS		NS	
Site	Well	Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
M13	<i>Upgradient</i>													
	MW806	1/31/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW806 (DUP)	1/31/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW806	4/9/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW807	1/31/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW807	4/9/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	<i>Downgradient</i>													
	MW126R	1/30/2013	<19		<19		<9.6		<19		<9.6		<9.6	
	MW126R	4/9/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW362	1/30/2013	4.3	F /	<19		<9.5		<19		<9.5		<9.5	
	MW362	4/9/2013	1.8	F /	<19		<9.5		<19		<9.5		<9.5	
	MW362 (DUP)	4/9/2013	1.7	F /	<19		<9.5		<19		<9.5		<9.5	
	<i>Downgradient</i>													
	MW808	1/30/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW808	4/9/2013	<19		<19		<9.5		<19		<9.5		<9.5	
	MW809	1/30/2013	<19		<19		<9.4		<19		<9.4		<9.4	
	MW809	4/9/2013	<19		<19		<9.5		<19		<9.5		<9.5	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the Long Term Monitoring Plan (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

Site M11 not sampled in spring

An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.

µg/L = Micrograms Per Liter

< = Result shows laboratory method reporting limit for non-detected results

Bolded result indicates Project Action Limit (RG) exceedance

DUP = Duplicate

NS = No Standard

2,6-DNT = 2,6-Dinitrotoluene

NB = Nitrobenzene

LF/VF = Lab Flag/Validation Flag

F = Concentration below the reported detection limit

Table 3-6

Groundwater Horizontal Gradients
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	January 2013					April 2013				
Site	Well Number	Well Number	Head Difference (ft)	Horizontal Separation (ft)	Horizontal Gradient	Well Number	Well Number	Head Difference (ft)	Horizontal Separation (ft)	Horizontal Gradient
	Groundwater Elevation (ft MSL)	Groundwater Elevation (ft MSL)				Groundwater Elevation (ft MSL)	Groundwater Elevation (ft MSL)			
LAP AREA										
L1	MW176	MW173			L1 (North)	MW176	MW173			L1 (North)
	NM	NM	NM	1620	NM	625.36	607.01	18.35	1620	0.0113
	MW611	MW610			L1 (South)	MW611	MW610			L1 (South)
	NM	NM	NM	400	NM	611.72	605.48	6.24	420	0.0149
L3/ Landfill L3	MW1	MW410				MW1	MW410			
	NM	NM	NM	780	NM	612.59	592.22	20.37	780	0.0261
MFG AREA										
M1	MW107	MW643				MW107	MW643			
	NM	NM	NM	430	NM	547.74	535.39	12.35	300	0.0412
M6	MW650	MW165			M6 (North)	MW650	MW165			M6 (North)
	NM	NM	NM	930	NM	555.72	538.88	16.84	937.5	0.0180
	MW309	MW160			M6 (South)	MW309	MW160			M6 (South)
	NM	NM	NM	840	NM	554.59	535.62	18.97	780	0.0243
M7	MW307	MW216				MW307	MW216			
	NM	NM	NM	1200	NM	544.02	532.41	11.61	1237.5	0.0094
Landfill M13	AEHA14R	MW126R				AEHA14R	MW126R			
	553.99	546.38	7.61	1160	0.0066	552.02	547.07	4.95	2025	0.0024

General Notes:

Sites L2, L14, and M11 are not sampled in spring.

ft = Feet

MSL = Mean Sea Level

Table 3-7

**Groundwater Flow Velocities
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

Site	Average K (cm/sec)	January Horizontal Gradient	April Horizontal Gradient	Effective Porosity	January			April		
					Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)	Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
L1⁽¹⁾	9.2E-06	NM	0.0131	0.3	NM	NM	NM	0.0000	0.0011	0.416
L3/Landfill L3⁽²⁾	1.6E-03	NM	0.0261	0.3	NM	NM	NM	0.0001	0.3945	143.986
M1	6.6E-05	NM	0.0412	0.3	NM	NM	NM	0.0000	0.0257	9.376
M6⁽³⁾	8.6E-04	NM	0.0212	0.3	NM	NM	NM	0.0001	0.1722	62.863
M7	6.7E-04	NM	0.0094	0.3	NM	NM	NM	0.0000	0.0595	21.715
Landfill M13	8.0E-02	0.0066	0.0024	0.3	0.0018	4.9877	1820.510	0.0006	1.8137	662.004
Average for Sites M6, M7, and M13	2.7E-02	NM	0.0110	0.3	NM	NM	NM	0.0010	2.8239	1030.737

General Notes:

Sites L2, L14, and M11 are not sampled in spring.

Hydraulic conductivity values are averages for the overburden aquifer.

Horizontal gradients are calculated using water table elevation data.

K = Hydraulic Conductivity

NM = Water Level Not Measured

MFG = Manufacturing Area Sites.

cm/sec = Centimeters Per Second

ft = Feet

Footnotes:

(1) Average of north and south gradients at L1 used for April measurements.

(2) No hydraulic conductivity data were available for Site L3 or Site L14. Values used are from nearby Site L2.

(3) Average of north and south gradients at M6 used for measurements.

Table 3-8

Vertical Gradient Calculations
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Area/Well ID	Ground Elevation (ft MSL)	Depth (ft) to top of screen (from ground)	Depth (ft) to bottom of screen (from ground)	Screen Length (feet)	Elevation of Screen Midpoint (ft MSL)	Groundwater Elevation 1/13 (ft MSL)	Vertical Gradient 1/13 (ft/ft)	Groundwater Elevation 4/13 (ft MSL)	Vertical Gradient 4/13 (ft/ft)
LOAD-ASSEMBLE-PACKAGE AREA										
L1	MW178	640.39	27.3	46.5	19.2	603.49	NM	NM	618.15	-0.3297
	MW176	643.49	4.8	20.8	16.0	630.69	NM		625.36	
	MW172	613.19	14.5	34.5	20.0	588.69	NM	NM	607.05	0.0022
	MW173	612.56	2.8	11.8	9.0	605.26	NM		607.01	
	MW177	613.84	11.8	31.0	19.2	592.44	NM	NM	608.65	0.0756
	MW171	615.03	2.9	7.9	5.0	609.63	NM		607.51	
	MW401	610.2	28.5	43.5	15.0	574.20	NM	NM	605.41	-0.0022
	MW610	609.62	4.0	14.0	10.0	600.62	NM		605.48	
L3/ Landfill L3	MW631	592.23	16.0	26.0	10.0	571.23	NM	NM	590.69	0.1107
	MW630	592.23	7.0	12.0	5.0	582.73	NM		588.75	
MANUFACTURING AREA										
M1	MW640	545.4	29.0	39.0	10.0	511.40	NM	NM	544.83	-0.0065
	MW351	545.68	9.5	19.5	10.0	531.18	NM		545.05	
	MW642	545.08	29.0	39.0	10.0	511.08	NM	NM	542.69	-0.0128
	MW641	545.08	7.0	17.0	10.0	533.08	NM		543.10	
M4	MW158	531.58	9.0	29.5	20.5	512.33	NM	NM	531.21	0.0194
	MW157	531.37	3.7	10.2	6.5	524.42	NM		530.85	
M6	MW312	545.96	40.0	55.0	15.0	498.46	NM	NM	547.52	0.0002
	MW311	546.36	14.0	24.0	10.0	527.36	NM		547.51	
	MW319	545.49	40.0	55.0	15.0	497.99	NM	NM	537.85	0.0048
	MW318	545.23	11.8	21.8	10.0	528.43	NM		537.66	
	MW313	549.20	25.0	40.0	15.0	516.70	NM	NM	539.22	0.0181
	MW654	548.49	13.0	23.0	10.0	530.49	NM		538.82	
	MW317	540.71	34.0	49.0	15.0	499.21	NM	NM	536.23	-0.0117
	MW316	540.49	13.0	18.0	5.0	524.99	NM		536.67	
	MW310R	563.00	44.5	59.5	15.0	511.00	NM	NM	543.00	-0.2659
	MW309	563.43	12.7	27.7	15.0	543.23	NM		554.59	
	MW315	538.91	29.7	44.7	15.0	501.71	NM	NM	535.49	0.0000
	MW314	539.53	9.7	14.7	5.0	527.33	NM		535.49	

Table 3-8

Vertical Gradient Calculations
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Area/Well ID	Ground Elevation (ft MSL)	Depth (ft) to top of screen (from ground)	Depth (ft) to bottom of screen (from ground)	Screen Length (feet)	Elevation of Screen Midpoint (ft MSL)	Groundwater Elevation 1/13 (ft MSL)	Vertical Gradient 1/13 (ft/ft)	Groundwater Elevation 4/13 (ft MSL)	Vertical Gradient 4/13 (ft/ft)
M6	MW308	561.38	50.5	65.5	15.0	503.38	NM	NM	542.39	-0.0401
	MW307	561.45	17.0	27.0	10.0	539.45	NM		544.02	
	MW651	563.83	36.0	46.0	10.0	522.83	NM	NM	548.59	NM
	MW650	563.83	12.0	22.0	10.0	546.83	NM		555.72	
	MW653	561.93	36.0	46.0	10.0	520.93	NM	NM	546.72	NM
	MW652	561.93	11.0	21.0	10.0	545.93	NM		553.72	
M7	MW217	536.90	19.5	34.5	15.0	509.90	NM	NM	533.34	0.0413
	MW216	536.51	5.0	10.0	5.0	529.01	NM		532.41	
	MW322	542.26	34.5	49.5	15.0	500.26	NM	NM	534.52	-0.1015
	MW321	542.93	13.5	23.5	10.0	524.43	NM		538.39	
	MW661	537.09	20.0	30.0	10.0	512.09	NM	NM	533.11	-0.0532
	MW660	537.08	7.0	12.0	5.0	527.58	NM		534.29	
Landfill M13	MW362	562.78	28.0	33.0	5.0	532.28	548.87	0.1766	549.09	0.1366
	MW126R	563.00	11.0	21.0	10.0	547.00	546.38		547.07	
	MW364	567.69	37.0	42.0	5.0	528.19	542.19	0.0160	542.65	0.0098
	MW363	567.66	21.0	31.0	10.0	541.66	541.97		542.51	
	MW807	563.79	35.0	45.0	10.0	523.79	549.51	-0.0495	550.01	-0.0441
	MW806	563.73	15.0	25.0	10.0	543.73	550.85		551.22	
	MW809	567.28	35.0	45.0	10.0	527.28	548.78	-0.1715	549.30	-0.1348
	MW808	567.33	15.0	25.0	10.0	547.33	553.23		552.73	

Notes:

Water Level in Deep Well - Water Level in Shallow Well

Vertical Gradient = -----

ABS (Water Table Elevation - Screen Midpoint of Deep Well)

Negative vertical gradients indicate downward flow, positive indicates upward flow.

ft = Feet

ft/ft = Feet Per Foot

MSL = Mean Sea Level

NA - well dry. Therefore, vertical gradient could not be calculated.

NM = Not Measured

ID = Identification

Sites L2, L14, and M11 not sampled in spring.

Table 3-9

Proposed Sampling Plan - Fall 2013
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Well ID	Parameter
L1	<i>In-plume</i>	
	MW131	E
	MW173	E
	WES1	E
	<i>Early Warning</i>	
	WES3	E
	MW174	E
	<i>Compliance</i>	
	SW550	E
L2	<i>In-plume</i>	
	MW404	E
	<i>Early Warning</i>	
	MW620	E
	<i>Compliance</i>	
	MW621	E
L3/ Landfill L3	<i>In-plume/Downgradient</i>	
	MW410	E
	MW412	E, M
	<i>Early Warning/Downgradient</i>	
	MW630	E, M
	MW631	E, M
	MW633	E, M
	<i>Compliance/Downgradient</i>	
	SW777	E, M
	<i>Downgradient</i>	
L14	<i>In-plume</i>	
	MW511	E
	MW512	E
	<i>Early Warning</i>	
	H7	E
M1	<i>In-plume</i>	
	MW107	S
	MW231	S
	MW640	S
	MW641	S
	MW642	S
	<i>Early Warning</i>	
	MW643	S
	MW644	S
	<i>Compliance</i>	
	MW645	S
	MW646	S
	MW648	S
	MW649	S
MFG	<i>In-plume</i>	
	MW212R	E
	MW330	S
	MW652	E
	<i>Early Warning</i>	
	MW123R	E
	MW124R	E
	MW162R	E
	MW313	E
	MW318	E
	MW319	E
	MW654	E
	<i>Compliance</i>	
	MW117	E
	MW118	E
	MW119	E

Table 3-9

**Proposed Sampling Plan - Fall 2013
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

Site	Well ID	Parameter
Landfill M11	<i>Upgradient</i>	
	MW802	E, I, M, SVOC & V
	MW803	E, I, M, SVOC & V
	<i>Downgradient</i>	
	MW333	E, I, M, SVOC & V
	MW334	E, I, M, SVOC & V
	MW335	E, I, M, SVOC & V
	MW336	E, I, M, SVOC & V
	MW804	E, I, M, SVOC & V
	MW805	E, I, M, SVOC & V
Landfill M13 ⁽¹⁾	<i>Upgradient</i>	
	MW806	E, I, M, SVOC & V
	MW807	E, I, M, SVOC & V
	<i>Downgradient</i>	
	MW126R	E, I, M, SVOC & V
	MW362	E, I, M, SVOC & V
	MW808	E, I, M, SVOC & V
	MW809	E, I, M, SVOC & V

General Notes:

V - Volatile Organic Compounds
SVOC - Semivolatile organic compounds
E - Explosives
M - Metals
I - Indicator parameters (Nitrate-N and Sulfate)
S - Sulfate
MFG - Manufacturing Area

Footnotes:

(1) Site M13 Landfill monitoring wells are sampled quarterly for these parameters in compliance with Illinois Administrative Code.

TABLE 4-1

Summary of Recommendations
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Report	Recommendation	Reasoning	Status Initiated/Pending
2009 Semi-annual			
	No recommendations regarding the monitoring program		
2009 Annual			
	Fall Sampling only at L2	Section 4.1.2.5 of LTM Plan, round with highest concentration	Initiated, Site L2 will not be sampled spring 2012
	Remove TAL metals analysis from Site L3 well MW410	No metals exceedances since sampling re-initiated in spring 2008	Initiated, metals at well MW410 were not sampled beginning fall 2011
	Remove Site M5 well MW207R from monitoring program	Section 4.1.7.4 of LTM Plan, no RG exceedances for 4 rounds	Initiated, well MW207R was not sampled beginning fall 2011
	Remove Site M3 wells MW233 and MW352 from monitoring program	Section 4.1.6.5 of LTM Plan, no RG exceedances for 4 rounds	Initiated, wells MW233 and MW352 were not sampled beginning fall 2011
	Prepare closure report for Site M3	Section 4.1.6.6 of LTM Plan, no RG exceedances for 4 rounds	Closure Report will be prepared in 2013
2010 Semi-annual			
	Remove Site L2 well MW501 from monitoring program	Section 4.1.2.5 of LTM Plan, no RG exceedances for 4 rounds	Initiated, well MW501 was not sampled fall beginning 2011
	Fall Sampling only at L14	Section 4.1.4.5 of LTM Plan, round with highest concentration	Initiated, Site L14 will not be sampled spring 2012
	Prepare closure report for Site M5	Section 4.1.7.4 of LTM Plan, no RG exceedances for 4 rounds	Closure Report will be prepared in 2013
	Remove cadmium analysis from Site M6 well MW123R	Section 4.1.7.4 of LTM Plan, no cadmium detections	Initiated, cadmium at well MW123R was not analyzed beginning fall 2010
2010 Annual			
	Remove Site L1 compliance well MW401 from monitoring program	No explosives detections. Site has upgradient early warning wells with no detections	Initiated, well MW401 will not be sampled beginning spring 2012
	Remove Site L1 early warning well MW172 from monitoring program	Well MW172 redundant with well MW173, upward vertical gradients	Initiated, well MW172 will not be sampled beginning spring 2012
	Change designation of Site L1 well MW173 to in-plume	Migration of contaminants	Initiated in 2011 Annual Report
	Remove Site L2 compliance well MW810 from monitoring program	No explosives detections. Site had upgradient early warning wells with no detections	Initiated, L2 is no longer sampled in spring and well MW810 will not be sampled in fall 2012
	Remove Site L3 compliance well MW632 from monitoring program	No explosives detections. Hydraulics suggest well not within migration flowpath	Initiated, well MW632 will not be sampled beginning spring 2012
	Change designation of Site M1 wells MW640, MW641, and MW642 to in-plume	Migration of contaminants	Initiated in 2011 Annual Report
	Remove Site M8 in-plume well MW148RR from monitoring program	In-plume well with no sulfate exceedances since spring 2009	Initiated, well MW148RR will not be sampled beginning spring 2012
	Remove Site M13 wells AEHA14R and AEHA15 from monitoring program and abandon	Problematic wells	Initiated, wells AEHA14R and AEHA15 will not be sampled beginning spring 2012
2011 Semi-annual			
	No new recommendations		
2011 Annual			
	At Site L3/Landfill L3 sample SW004 in spring only	Upstream sample SW555 provides data for fall rounds	Initiated, SW004 wil no longer sampled in fall when Site L2 is sampled
	Remove Site Landfill L3/Landfill L3 upgradient well MW03 from monitoring program	No RG exceedances at Site L3 in-pume well MW410	Initiated, well MW03 will not be sampled beginning spring 2012
	Remove Site L14 in-plume well MW508 from monitoring program	No RG exceedances	Initiated, well MW508 will not be sampled beginning spring 2012
	Remove Site L14 compliance wells MW603 and MW604 from monitoring program	Redundant, no RG exceedances in early warning well H7	Initiated, wells MW603 and MW604 will not be sampled beginning spring 2012
	Remove MFG compliance wells MW115 and MW116 from monitoring program	Redundant, no RG exceedances in upgradient Site M6 early warning wells MW123R and MW162R or Site M7 early warning well MW124R	Initiated, wells MW115 and MW116 will not be sampled beginning spring 2012
	Remove MFG compliance wells MW112 and MW113 from monitoring program	Removal of upgradient Site M5 in-plume well MW207R from monitoring program and Site M5 closure	Initiated, wells MW112 and MW113 will not be sampled beginning spring 2012
	Prepare closure report for Site M8	Removal of in-plume well MW148RR from monitoring program	Closure Report will be prepared in 2013
	Fall Sampling only at M11	Section 4.2.2.5 of LTM Plan, stable and predictable results	Pending, recommendation has not been approved. However wells MW333, MW334, MW803, and MW804 will not be sampled in spring 2012
2012 Semi-annual			
	Rip rap along Prairie Creek at Site L3 required repair	Rip rap has been washed away at some locations	Pending
	Install monitoring well downgradient of Site M13 to replace monitoring wells AEHA14R and AEHA15	Monitoirng wells AEHA14R and AEHA15 removed from monitoring program.	Pending
2012 Annual			
	No new recommendations		
2013 Semi-annual			
	No new recommendations		

Notes:

- Does not include minor maintenance activities such as replacing well locks.
- Does not include recommendations repeated in subsequent reports.

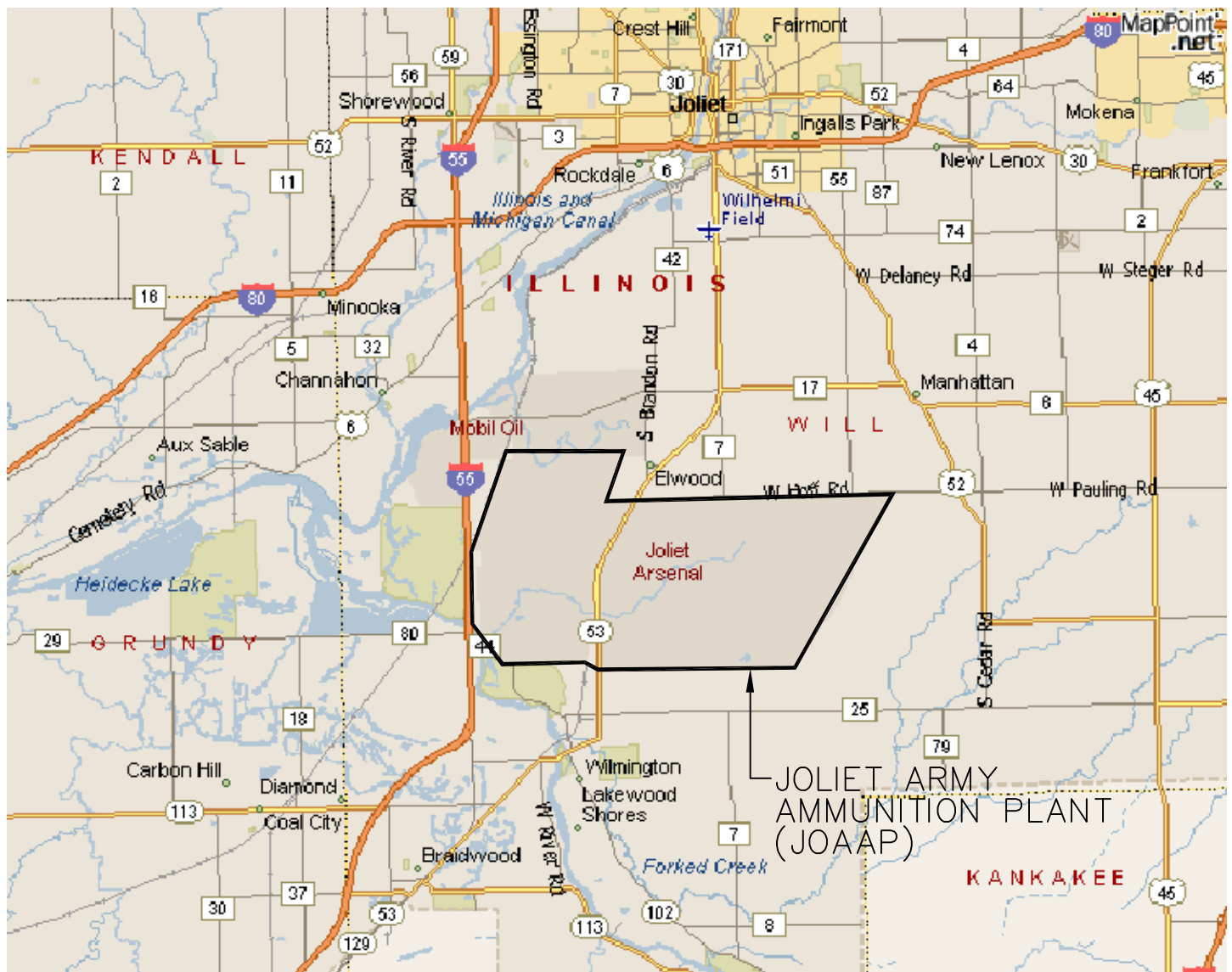
FIGURES

Approved By & Date:

Revised By & Date:

Approved By & Date:

Drawn By & Date:



NOTE

BASE MAP DEVELOPED FROM
2002 MICROSOFT CORPORATION,
EXPEDIA.COM.



ILLINOIS



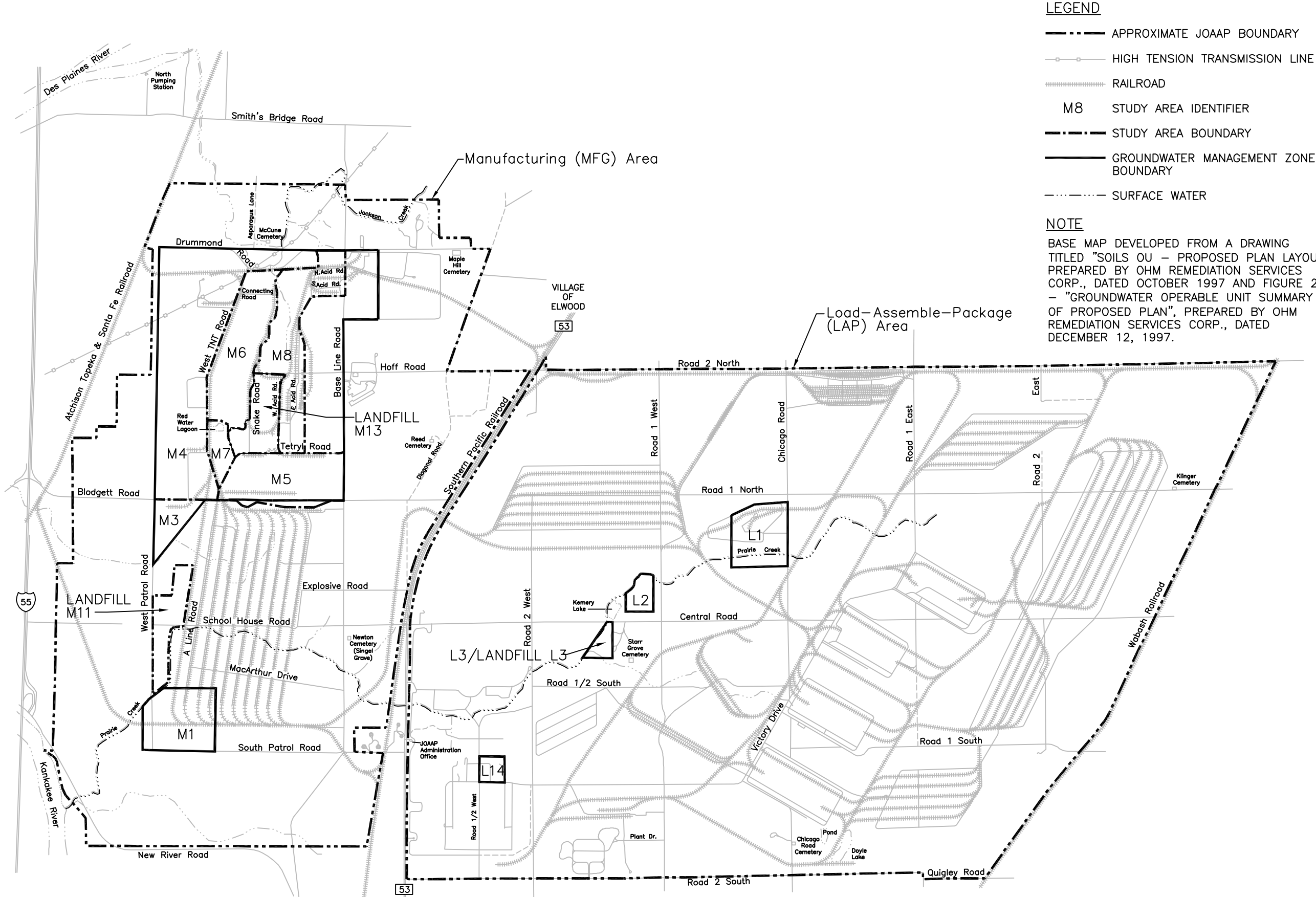
RJR	TLP
DEVELOPED BY	DRAWN BY
APPROVED	DATE
REVISIONS	DATE

CONTRACT NO. W91ZLK-05-D-0012 DELIVERY ORDER NO. 0001
VERIFY SCALE 0 1/2 1 BAR REPRESENTS ONE INCH

SITE LOCATION MAP
2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS

FIGURE 1-1

TOIEST, INC.





LEGEND

- MW176 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW171 SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW178 DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW550 SURFACE WATER MONITORING LOCATION AND NUMBER
- 608 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
- COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
- WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 8, 2013.
- MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP – LAP AREA, SITE L1 (APRIL 2013)

2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
7/9/2013

FIGURE 3-2

DRAWING NUMBER
2091115
06010402

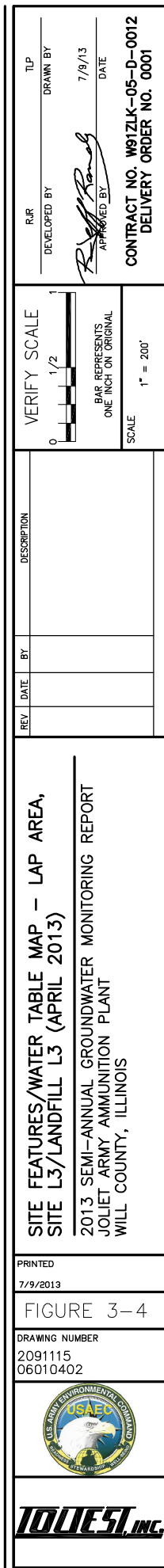
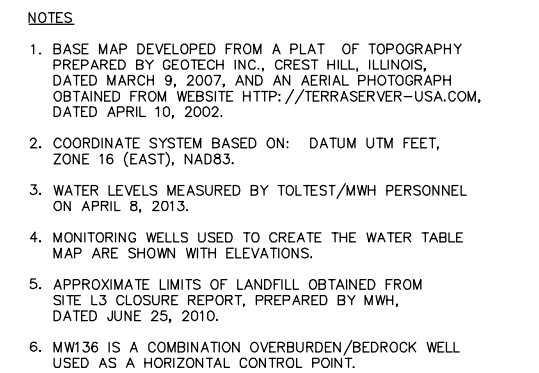
USAEC
U.S. ARMY ENVIRONMENTAL CENTER
TERRELL, TEXAS

TOLTEST, INC.

VERIFY SCALE
0 1/2 1
BAS REPRESENTS
ONE INCH ON ORIGINAL
SCALE
1" = 300'

RJR DEVELOPED BY
TLP DRAWN BY
7/9/13 DATE
APPROVED BY
CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001







- LEGEND**
- MW134 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
 - MW136 (596.68) COMBINED MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
 - MW630 (588.75) SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
 - MW412 (594.68) DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
 - SW777 SURFACE WATER MONITORING LOCATION AND NUMBER
 - 590 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
 - DIRECTION OF BEDROCK FLOW
 - DIRECTION OF FLOW IN PRAIRIE CREEK
 - GROUNDWATER MANAGEMENT ZONE BOUNDARY
 - APPROXIMATE LIMITS OF LANDFILL

- NOTES**
1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
 2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
 3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 8, 2013.
 4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
 5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
 6. MW411 AND MW136 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED FOR HORIZONTAL CONTROL POINTS.

REV	DATE	BY	DESCRIPTION


POTENTIOMETRIC SURFACE MAP – LAP AREA,
SITE L3/LANDFILL L3 (APRIL 2013)


2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
7/9/2013

FIGURE 3–5

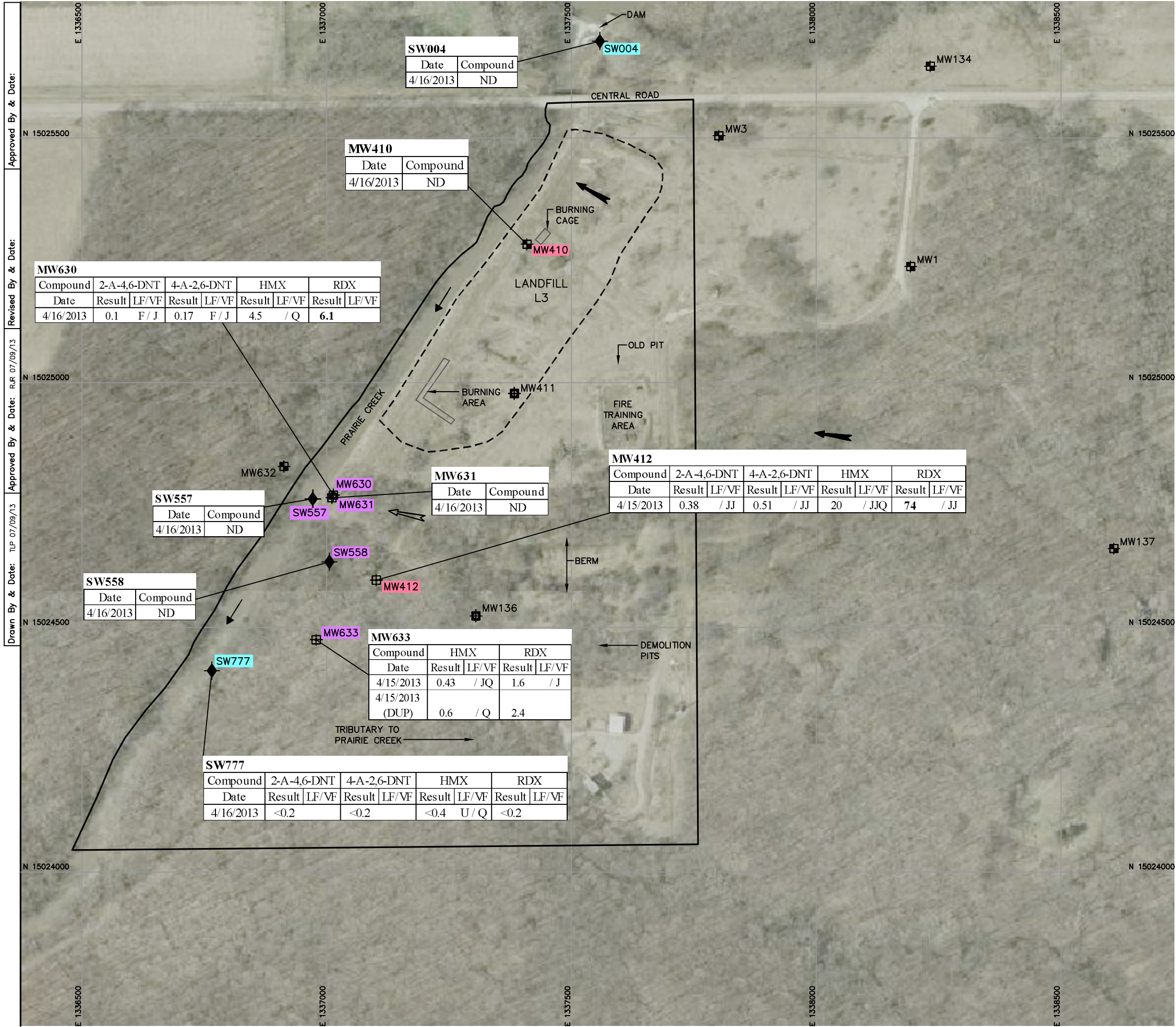
DRAWING NUMBER
2091115
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RJR	TLP
DEVELOPED BY	DRAWN BY
APPROVED BY	DATE
7/9/13	DATE

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001



LEGEND

MW410 OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

MW411 COMBINED MONITORING WELL LOCATION AND NUMBER

MW630 SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

MW412 DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

SW777 SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

IN-PLUME/DOWNGRADIENT MONITORING POINT

EARLY WARNING/DOWNGRADIENT MONITORING POINT

COMPLIANCE/DOWNGRADIENT AND UPGRADE MONITORING POINT

DIRECTION OF WATER TABLE FLOW

DIRECTION OF BEDROCK FLOW

DIRECTION OF FLOW IN PRAIRIE CREEK

GROUNDWATER MANAGEMENT ZONE BOUNDARY

APPROXIMATE LIMITS OF LANDFILL

RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS

2-A-4,6-DNT 2-AMINO-4,6-DINITROTOLUENE

4-A-2,6-DNT 4-AMINO-2,6-DINITROTOLUENE

HMX HIGH MELTING EXPLOSIVE

RDX ROYAL DEMOLITION EXPLOSIVE

DUP DUPLICATE

LF/VF LAB FLAG/VALIDATION FLAG

F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT

/J ESTIMATED CONCENTRATION

/JJ ESTIMATED CONCENTRATION DUE TO MORE THAN ONE CRITERIA

U/ NOT DETECTED

/Q LABORATORY CONTROL SAMPLE RECOVERY LOWER THAN QUALITY CONTROL LIMITS

ND NOT DETECTED

NS NO STANDARD

RG REMEDIATION GOAL

Compound	Project Action Limit ⁽¹⁾	Surface Water RG
2-A-4,6-DNT	NS	NS
4-A-2,6-DNT	NS	NS
HMX	5100	260
RDX	2.6	500

- NOTES
1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2013.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLD VALUE INDICATES RG EXCEEDANCE.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.



EXPLOSIVES DETECTIONS - LAP AREA, SITE L3/LANDFILL L3 (APRIL 2013)

2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT

JOLIET ARMY AMMUNITION PLANT

WILL COUNTY, ILLINOIS

PRINTED

7/9/2013

FIGURE 3-6

DRAWING NUMBER

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06010402

U.S. ARMY ENVIRONMENTAL COMMAND

TOQUEST INC.



LEGEND

- MW104 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW105 COMBINED MONITORING WELL LOCATION AND NUMBER
- MW640 DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION (544.83)
- SW709 SURFACE WATER MONITORING LOCATION AND NUMBER
- 540 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

- NOTES**
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraSERVER-USA.COM), DATED APRIL 10, 2002.
 2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
 3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 11 AND 15, 2013.
 4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.



RJR DEVELOPED BY		TLP DRAWN BY	
APPROVED BY		DATE	
7/9/13		7/9/13	
CONTRACT NO. W91ZLK-05-D-0012		DELIVERY ORDER NO. 0001	

VERIFY SCALE	SCALE
0 1/2 1	1" = 300'
BAS REPRESENTS ONE INCH ON ORIGINAL	

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP - MANUFACTURING AREA, SITE M1 (APRIL 2013)

2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT

JOLIET ARMY AMMUNITION PLANT

WILL COUNTY, ILLINOIS

PRINTED

7/9/2013

FIGURE 3-8

DRAWING NUMBER

2091115

06010402

TOLTEST, INC.



LEGEND

MW648 OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS

MW641 COMBINED MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS

MW642 DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS

SW709 SURFACE WATER MONITORING LOCATION, NUMBER, AND SULFATE DETECTIONS

IN-PLUME MONITORING POINT

EARLY WARNING MONITORING POINT

COMPLIANCE MONITORING POINT

DIRECTION OF WATER TABLE FLOW

DIRECTION OF BEDROCK FLOW

DIRECTION OF FLOW IN PRAIRIE CREEK

GROUNDWATER MANAGEMENT ZONE BOUNDARY

DUP DUPLICATE

LF/VF LAB FLAG/VALIDATION FLAG

mg/L MILLIGRAMS PER LITER

NS NO STANDARD

RG REMEDIATION GOAL

Sulfate	
Units	mg/L
Project Action Limit ⁽¹⁾	400
Surface Water RG	NS

- NOTES**
1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
 2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
 3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
 4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2013.
 5. CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (mg/L).
 6. BOLDLED VALUE INDICATES RG EXCEEDANCE.



TLP DRAWN BY 7/9/13 DATE	
RJR DEVELOPED BY APPROVED BY CONTRACT NO. W91ZLK-05-D-0012 DELIVERY ORDER NO. 0001	
VERIFY SCALE 0 1/2 1 BAG REPRESENTS ONE INCH ON ORIGINAL SCALE 1" = 300'	DESCRIPTION
REV	DATE
SULFATE DETECTIONS - MANUFACTURING AREA, SITE M1 (APRIL 2013) 2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS	
PRINTED 7/9/2013	
FIGURE 3-9	
DRAWING NUMBER 2091115 06010402	

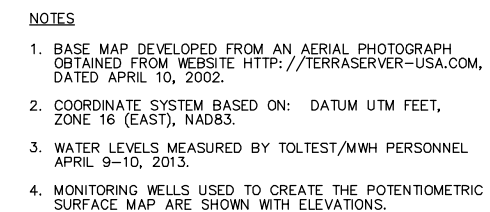


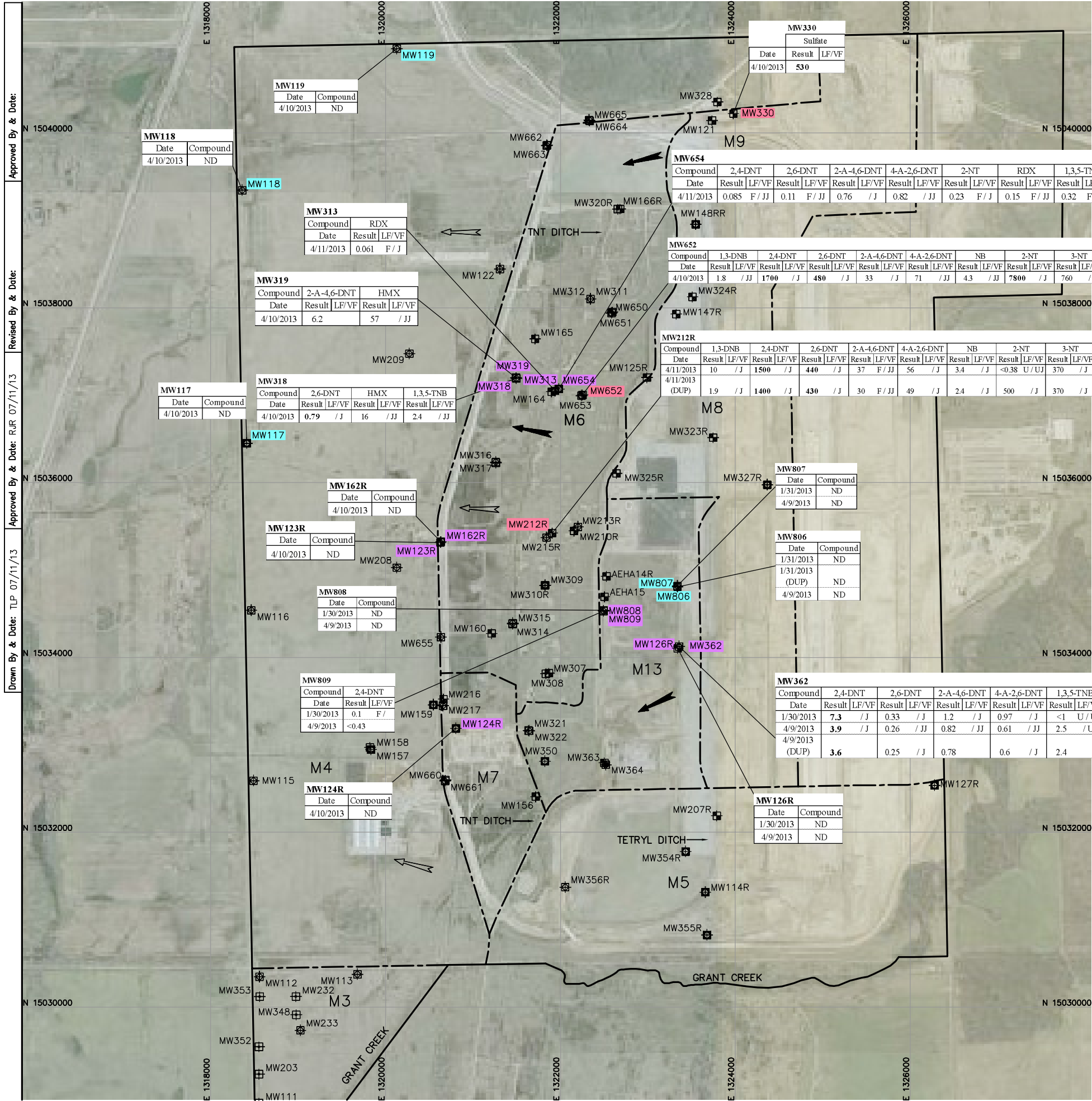
- LEGEND
- MW325R (556.37) OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
 - MW652 (553.72) COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
 - MW356 SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
 - MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
 - 550 WATER TABLE CONTOUR (CONTOUR INTERVAL: 2', DASHED WHERE INFERRED)
 - DIRECTION OF WATER TABLE FLOW
 - GROUNDWATER MANAGEMENT ZONE BOUNDARY
 - STUDY AREA BOUNDARIES

- NOTES
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
 2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
 3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL APRIL 9-10, 2013.
 4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
 5. MW117, MW127R, AND MW327R ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.



TLP DRAWN BY 7/9/13 DATE	
RJR DEVELOPED BY APPROVED BY CONTRACT NO. W91ZLK-05-D-0012 DELIVERY ORDER NO. 0001	
VERIFY SCALE 0 1/2 BARS REPRESENTS ONE INCH ON ORIGINAL SCALE 1" = 1200'	
DESCRIPTION	
BY	
DATE	
REV	
SITE FEATURES/WATER TABLE MAP - MANUFACTURING AREA, MFG - SITES M4, M5, M6, M7, M8, M9, M13, AND OTHER AREAS (APRIL 2013)	
2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS	
PRINTED 7/9/2013	FIGURE 3-10
DRAWING NUMBER 2091115 06010402	





LEGEND

- MW212R OVERBURDEN MONITORING WELL LOCATION NUMBER, AND EXPLOSIVES DETECTIONS
- MW124R COMBINED MONITORING WELL LOCATION NUMBER, AND EXPLOSIVES DETECTIONS
- MW115 SHALLOW BEDROCK MONITORING WELL LOCATION NUMBER, AND EXPLOSIVES DETECTIONS
- MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES
- RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS

1,3-DNB 1,3-DINITROBENZENE
2,4,6-TNT 2,4,6-TRINITROTOLUENE
2,4-DNT 2,4-DINITROTOLUENE
2,6-DNT 2,6-DINITROTOLUENE
2-A-4,6-DNT 2-AMINO-4,6-DINITROTOLUENE
2-NT 2-NITROTOLUENE
3-NT 3-NITROTOLUENE
4-A-2,6-DNT 4-AMINO-2,6-DINITROTOLUENE
4-NT 4-NITROTOLUENE
HMX HIGH MELTING EXPLOSIVE
RDX ROYAL DEMOLITION EXPLOSIVE
NB NITROBENZENE
DUP DUPLICATE
F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
/J ESTIMATED CONCENTRATION
/JJ ESTIMATED CONCENTRATION DUE TO MORE THAN ONE CRITERIA
U/ NOT DETECTED
/UJ NOT DETECTED, ESTIMATED DETECTION LIMIT
LF/VF LAB FLAG/VALIDATION FLAG
ND NOT DETECTED
NS NO STANDARD
RG REMEDIATION GOAL

Compound	Project Action Limit ⁽¹⁾	Surface Water RG
1,3-DNB	10	4
2,4-DNT	0.42	330
2,6-DNT	0.42	150
2-A-4,6-DNT	NS	NS
NB	51	8000
2-NT	5100	62
3-NT	NS	NS
4-A-2,6-DNT	NS	NS
4-NT	NS	NS
HMX	5100	260
RDX	2.6	500
Sulfate	400	NS
2,4,6-TNT	9.5	75

- NOTES**
- REMEDATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (GAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
 - BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
 - COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
 - SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN JANUARY AND APRIL 2013.
 - CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L) WITH THE EXCEPTION OF SULFATE, REPORTED IN MILLIGRAMS PER LITER (mg/L).
 - BOLDED VALUE INDICATES RG EXCEEDANCE.

APPROVED BY & DATE: 7/11/13
DRAWN BY: TLP

REVISOR: RJR
DEVELOPED BY: R. J. Ramsey
APPROVED BY: R. J. Ramsey
DATE: 7/11/13

CONTRACT NO. W91ZLK-05-D-0012
DELIVERY ORDER NO. 0001

VERIFY SCALE
1/2
0 1 2
BARS REPRESENTS
ONE INCH ON ORIGINAL
SCALE
1" = 1200'

DESCRIPTION

EXPLOSIVES AND SULFATE DETECTIONS
MANUFACTURING AREA - SITES M4, M5, M6, M7, M8, M9, M13 AND OTHER AREAS (2013)
2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS


REV. DATE


BY

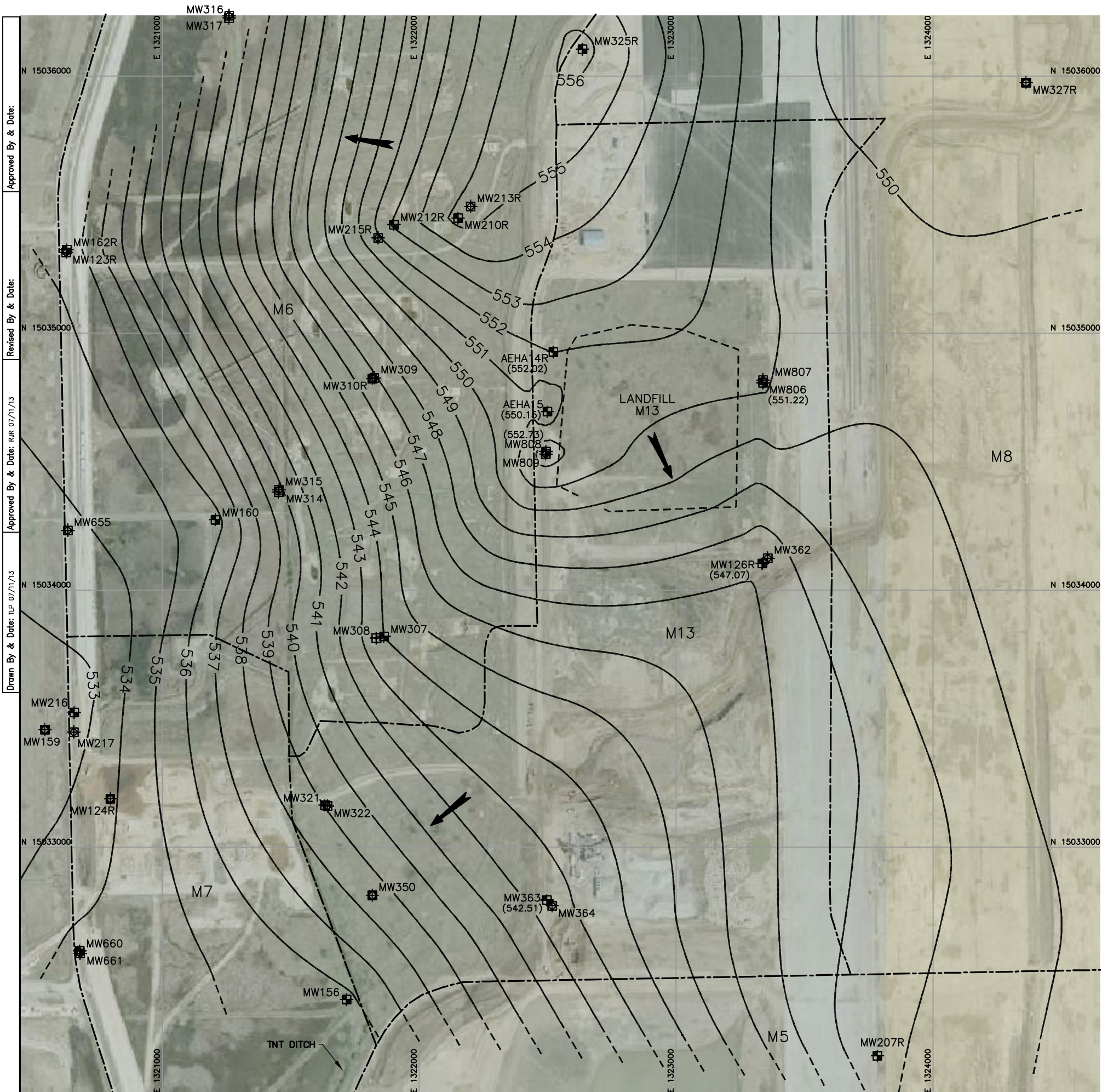
PRINTED
7/11/2013

FIGURE 3-12

DRAWING NUMBER
2091115
06010402







LEGEND

- MW126R (547.07)
OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW350
COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356
SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308
DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550
WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. SEE FIGURE 3-10 FOR WATER TABLE CONFIGURATION OF AREA SURROUNDING LANDFILL M13.
4. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 9, 2013.
5. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
6. SEE FIGURE 3-10 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

RJR		TLP	
DEVELOPED BY		DRAWN BY	
7/11/13		DATE	
APPROVED BY		DATE	
CONTRACT NO. W91ZLK-05-D-0012			
DELIVERY ORDER NO. 0001			

VERIFY SCALE		1" = 400'	
		BAS REPRESENTS ONE INCH ON ORIGINAL	

DESCRIPTION	BY	DATE

WATER TABLE MAP -
MANUFACTURING AREA, SITE M13 LANDFILL (APRIL 2013)

2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
7/11/2013

FIGURE 3-14

DRAWING NUMBER
2091115
06010402

U.S. ARMY ENVIRONMENTAL COMMISSION





- LEGEND**
- MW126R OVERBURDEN MONITORING WELL LOCATION AND NUMBER
 - MW350 COMBINED MONITORING WELL LOCATION AND NUMBER
 - MW362 (548.87) SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
 - MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
 - 550 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
 - Direction of bedrock flow
 - Study area boundaries
 - Approximate limits of landfill

- NOTES**
- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
 - COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
 - WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON JANUARY 31, 2013.
 - MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
 - APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.



REV		DATE	BY	DESCRIPTION
VERIFIED SCALE		1" = 400'		
DRAWN BY		TLP		
DEVELOPED BY		DATE		
APPROVED BY		DATE		
CONTRACT NO. W91ZLK-05-D-0012				
DELIVERY ORDER NO. 0001				
POTENTIOMETRIC SURFACE MAP – MANUFACTURING AREA, SITE M13 LANDFILL (JANUARY 2013)				
2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT				
JOLIET ARMY AMMUNITION PLANT				
WILL COUNTY, ILLINOIS				
PRINTED				
7/11/2013				
FIGURE 3-15				
DRAWING NUMBER				
2091115				
06010402				



LEGEND

- MW126R OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 COMBINED MONITORING WELL LOCATION AND NUMBER
- MW362 (549.09) SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 545 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. SEE FIGURE 3-11 FOR POTENTIOMETRIC SURFACE CONFIGURATION OF AREA SURROUNDING LANDFILL M13.
4. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 9, 2013.
5. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
6. SEE FIGURE 3-11 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.



REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP –
MANUFACTURING AREA, SITE M13 LANDFILL (APRIL 2013)

2013 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
7/12/2013

FIGURE 3-16

DRAWING NUMBER
2091115
06010402

U.S. ARMY ENVIRONMENTAL COMMAND
ILLINOIS

TOLTEST, INC.

RJR	TLP
DEVELOPED BY	DRAWN BY
APPROVED BY	DATE
7/12/13	
CONTRACT NO. W91ZLK-05-D-0012	DELIVERY ORDER NO. 0001

APPENDIX A

LANDFILL INSPECTION REPORTS

A1 – LANDFILL INSPECTION REPORT – JANUARY 2013

A2 – LANDFILL INSPECTION REPORT – APRIL 2013

A1 – LANDFILL INSPECTION REPORT – JANUARY 2013

POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13

**for the Performance-Based Acquisition of
Environmental Remediation Services at
Joliet Army Ammunition Plant
Joliet, Illinois**

January 2013

Submitted to:



**US Army Contracting Agency
APG Directorate of Contracting - AEC Team
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012
Delivery Order No. 0001**

TolTest Project Number: 22271.01

Submitted by:



**1480 Ford Street
Maumee, OH 43537
(419) 794-3500**

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188		
<p>The public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</p>					
1. REPORT DATE (DD-MM-YYYY) 01-31-2013		2. REPORT TYPE Technical		3. DATES COVERED (From – To) January to March 2013	
4. TITLE AND SUBTITLE Post-Closure Inspection Report for Landfills L3, M11 and M13 for the 2008 Performance-Based Acquisition for Environmental Remediation, Joliet Army Ammunition Plant, Joliet, Illinois			5a. CONTRACT NUMBER W91ZLK-05-D-0012		
			5b. GRANT NUMBER NA		
			5c. PROGRAM ELEMENT NUMBER NA		
6. AUTHOR(S) TolTest, Inc.			5d. PROJECT NUMBER Delivery Order 0001		
			5e. TASK NUMBER NA		
			5f. WORK UNIT NUMBER NA		
PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) TolTest, Inc. 1480 Ford Street Maumee, OH 44087			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) USAEC - Louisville District Aberdeen Proving Ground – W91ZLK 4118 Susquehanna Ave Aberdeen Proving Ground, MD 21005-3013			10. SPONSOR/MONITOR'S ACRONYM(S) CELRL-ED-EE		
			11. SPONSOR/MONITOR'S REPORT NUMBER NA		
12. DISTRIBUTION/AVAILABILITY STATEMENT Reference Distribution Page					
13. SUPPLEMENTARY NOTES None.					
14. ABSTRACT This Post-Closure Inspection report presents TolTest's findings for the conditions at landfills L3, M11 and M13 pursuant to the requirements of the Performance-Based Contract for Environmental Remediation at the Joliet Army Ammunition Plant.					
15. SUBJECT TERMS Landfill, Inspection Report, L3, M11, M13					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18 NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			

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POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13

**for the Performance-Based Acquisition of
Environmental Remediation Services at
Joliet Army Ammunition Plant
Joliet, Illinois**

Submitted to:



**US Army Contracting Agency
APG Directorate of Contracting - AEC Team
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012
Delivery Order No. 0001**

TolTest Project Number: 22271.01

Submitted by:



**1480 Ford Street
Maumee, OH 43537
(419) 794-3500**

January 2013

DOCUMENT DISTRIBUTION
for the
Post-Closure Inspection Report for Landfills
L3, M11, and M13
for the Performance-Based Acquisition of
Environmental Remediation
Joliet Army Ammunition Plant
Joliet, Illinois

Organization	Distribution	
	Paper	Electronic
Joliet Army Ammunition Plant	2	2
Joliet Environmental Information Management System	0	1
United States Army Environmental Command	1	2
United States Army Corps of Engineers - Louisville District	0	2

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List of Attachments

Attachment A	Post-Closure Inspection Checklists
Attachment B	Inspection Photographs

LIST OF ACRONYMS

GMZ Ground Water Monitoring Zone

IAC Illinois Administrative Code

JOAAP Joliet Army Ammunition Plant

L3 JOAAP Landfill L3

M11 JOAAP Landfill M11

M13 JOAAP Landfill M13

RA Remedial Action

RG Remedial Goal

USAEC United States Army Environmental Command

POST-CLOSURE INSPECTION REPORT

1.0 Introduction

This document has been prepared for the United States Army Environmental Command to provide documentation of the conditions of three landfills (L3, M11, and M13) located at the former Joliet Army Ammunition Plant (JOAAP).

Post-closure monitoring requirements for Landfills L3, M11 and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed; and
- Keep survey points protected and visible to facilitate identification in the future.

1.1 Landfill Cover Maintenance

According to IAC, the Landfills L3, M11 and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover;
- Erosion features;
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring; and
- Debris or blockage of drainage structures.

Any damages or changes noted will be repaired to comply with the final design specifications for the cover.

Site inspections were conducted on 31 January 2013 for landfill M13, M11 and L3. This report includes copies of the inspection checklist, photographs, recommendations, and conclusions. The Post-Closure Inspection Checklists are found in Attachment A, and Inspection Photographs are found in Attachment B.

2.0 Landfill Descriptions

2.1 Landfill L3

Landfill L3 is located on the western edge of the Site L3 GMZ on the east bank of Prairie Creek. The GMZ comprises approximately 50 acres used as a demolition area directly southwest of Site L2, of which the landfill occupies only 3.32 acres. The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the site as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. The remedy selected for the consolidated area along Prairie Creek was capping to form Landfill L3. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and quickly be discharged as the groundwater flows upward into the surface water body.

2.1.1 Monitoring Locations

Both groundwater and surface water sample points are monitored at Landfill L3 during spring and fall sampling rounds as follows:

- Upgradient Locations
 - SW004 (Surface location where Prairie Creek first touches the L3 GMZ boundary and upstream of the storm water outfall, spring only).
- Downgradient Locations
 - MW410
 - MW412
 - MW630
 - MW631
 - MW633
 - SW777 (Surface water location in Prairie Creek near the L3 GMZ boundary)
 - SW557 (Surface water location in Prairie Creek just upstream of the landfill drainage swale discharge)
 - SW558 (Surface water location at the constructed drainage swale along the southwest side of the newly constructed landfill)

2.2 Landfill M11

Landfill M11 is located in the southwestern portion of the manufacturing side of JOAAP. The GMZ comprises approximately 133 acres. Site M11 was divided into two sections by School House Road and bordered on the west by West Patrol Road. M11 north encompassed approximately 10.5 acres of former gravel pits that were mined and filled with waste. M11 south, a former gravel pit, encompassed approximately 5.6 acres that was also mined and filled with waste. The remedy chosen for Landfill M11 was waste consolidation and capping. Implementation of the remedy began in 2006 and was completed in 2008.

The current conceptual site model is that Landfill M11 is believed to contain manganese and sulfate containing waste that could potentially contaminate underlying groundwater and migrate beyond the GMZ.

With the implementation of the RA at Site M11, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill thus, preventing groundwater contamination.

2.2.1 Monitoring Locations

Groundwater sample points are monitored at Landfill M11 in fall as follows:

- Upgradient Locations
 - MW802
 - MW803
- Downgradient Locations

- MW333
- MW334
- MW335
- MW336
- MW804
- MW805

2.3 Landfill M13

Landfill M13 comprises approximately 106 acres of the central portion of the MFG Area known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area. Disposal activities were confined to four discrete areas on the site, none of which extended beyond 12 acres in size. Historical records indicate landfill disposal took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

Soil in the vicinity of the Northern Gravel Pit had been found to contain beryllium, lead, and benzo(a)pyrene as COCs. Explosive compounds that have been observed in groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT. On a single occasion in 1991, antimony and cadmium were reported to be present at concentrations in excess of their respective RGs, but they have not exceeded the RGs since then. It is difficult to determine if the original findings could have resulted from turbid samples since low flow sampling and micro purging techniques are now employed to obtain more representative samples.

The current conceptual site model is that metal and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit.

With the implementation of the RA on the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

2.3.1 Monitoring Locations

Groundwater is monitored quarterly through sample collection and analysis at six monitoring wells:

- Upgradient or background wells
 - MW806
 - MW807
- Downgradient or source control wells
 - MW126R
 - MW362
 - MW808
 - MW809

3.0 Inspection Results

The following are the observations from the landfill inspections conducted at L3, M11, and M13 on 31 January 2013.

3.1 Landfill L3

The perimeter fence and site postings were in good condition. The vegetative cover was well established and no erosion was observed. No woody plants were observed on the landfill cap during the inspection. No subsidence was observed nor was there any evidence of damage due to burrowing animals. The rip rap along Prairie Creek at Site L3 appears to be stable and does not appear to be failing. Woody growth is present within the rip rap along Prairie creek which needs to be removed.

3.2 Landfill M11

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion was observed. No woody plants were observed on the landfill cap during the inspection. The rip rap along the perimeter was evenly applied and no erosion channels were detected. There was no evidence of damage due to burrowing animals. The vents were undamaged and appeared to be in working order. Woody growth is present within the rip rap and needs to be removed.

3.3 Landfill M13

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion was observed. No woody plants were observed on the landfill cap during the inspection. The rip rap along the perimeter was evenly applied and no erosion channels were detected. The vents were undamaged and appeared to be in working order.

4.0 Conclusions and Recommendations

The deficiencies noted within this report which need to be addressed include the following:

Landfill L3:

- Repair rip rap along Prairie creek. The Army is currently preparing the contract documentation necessary for implementation of the repairs.

Landfill M11:

- Some woody growth was observed in the rip rap on the south side of the landfill.

Landfill M13:

- No deficiencies were observed.

Attachment A
Post-Closure Inspection Checklists

JOAAP LANDFILL INSPECTION CHECKLIST

Landfill Designation: M11		Date of Inspection: January 31, 2013	
Inspected By: Gary Reside, TolTest Environmental Manager		Weather Conditions: Snow	
Names of those present at inspection:			
Checklist	Yes	No	Explanation
Site Security			
a) Was fencing, gates and signs in good condition?	√		
b) Were gates locked?		√	Chained shut with no lock
c) Evidence of trespassing		√	
Landfill Cover			
d) Evidence of Settling and/or Ponding?		√	
e) Any desiccation or cracking detected?		√	
f) Erosion around cap?		√	
g) Animal burrowing detected?		√	
Vegetation Condition			
h) Is vegetation well established?	√		
i) Evidence of vegetation detrimental to cap?		√	
Landfill structures			
j) Evidence of damage to monitoring wells?		√	
k) Evidence of damage to gas vents?		√	
Field Conclusions			
l) Is there an imminent hazard to the integrity of the unit?		√	
m) Are repairs necessary?		√	
Certification			
Inspector Signature: Gary Reside		Printed Name: Gary Reside	
Title: Environmental Manager		Date: January 31, 2013	

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: L3		Date of Inspection: January 31, 2013	
Inspected By: Gary Reside, TolTest Environmental Manager		Weather Conditions: Snow	
Names of those present at inspection:			
Checklist	Yes	No	Explanation
Site Security			
a) Was fencing, gates and signs in good condition?	√		
b) Were gates locked?	√		
c) Evidence of trespassing		√	
Landfill Cover			
d) Evidence of Settling and/or Ponding?		√	
e) Any desiccation or cracking detected?		√	
f) Erosion around cap?		√	
g) Animal Burrowing detected?		√	
Vegetation Condition			
h) Is vegetation well established?	√		
i) Evidence of vegetation detrimental to cap?		√	
Landfill structures			
j) Evidence of damage to monitoring wells?		√	
k) Evidence of damage to gas vents?		√	
Field Conclusions			
l) Is there an imminent hazard to the integrity of the unit?		√	
m) Are repairs necessary?	√		Rip Rap on West side needs repairs
Certification			
Inspector Signature: Gary Reside		Printed Name: Gary Reside	
Title: Environmental Manager		Date: January 31, 2013	

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: M13		Date of Inspection: January 31, 2013	
Inspected By: Gary Reside, TolTest Environmental Manager		Weather Conditions: Snow	
Names of those present at inspection:			
Checklist	Yes	No	Explanation
Site Security			
a. Was fencing, gates and signs in good condition?	√		
b. Were gates locked?	√		
c. Evidence of trespassing		√	
Landfill Cover			
d. Evidence of Settling and/or Ponding?		√	
e. Any desiccation or cracking detected?		√	
f. Erosion around cap?		√	
g. Animal burrowing detected?		√	
Vegetation Condition			
h. Is vegetation well established?	√		
i. Evidence of vegetation detrimental to cap?		√	
Landfill structures			
j. Evidence of damage to monitoring wells?		√	
k. Evidence of damage to gas vents?		√	
Field Conclusions			
l. Is there an imminent hazard to the integrity of the unit?		√	
m. Are repairs necessary?		√	
Certification			
Inspector Signature:		Printed Name: Gary Reside	
Title: Environmental Manager		Date: January 31, 2013	

Attachment B
Inspection Photographs



M13 East side looking South.



M13 Northeast corner looking Southwest.



M13 Northeast corner looking West.



M13 Southeast side looking West.



M13 East side looking Southwest.



M13 Southeast corner looking North.



M13 Southwest corner looking East.



M13 West side looking South.



M11 South side gate.



M11 East side looking Northwest.



M11 East side looking North.



M11 east side looking North.



M11 West side looking East.



M11 West side Looking North.



M11 West side looking North.



M11 Northwest corner looking South.



M11 Top of cap looking North.



M11 Top of cap looking North.



L3 West side looking South along Prairie Creek.



L3 North side.



L3 Northwest corner looking Southeast.



L3 East side looking South.



L3 South side looking West.



L3 south side looking South.



L3 top of cap looking Southwest.



L3 top of cap looking Southeast.



L3 West side looking North.

A2 - LANDFILL INSPECTION REPORT – APRIL 2013

POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13

**for the Performance-Based Acquisition of
Environmental Remediation Services at
Joliet Army Ammunition Plant
Joliet, Illinois**

April 2013

Submitted to:



**US Army Contracting Agency
APG Directorate of Contracting - AEC Team
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012
Delivery Order No. 0001**

TolTest Project Number: 22271.01

Submitted by:



**1480 Ford Street
Maumee, OH 43537
(419) 794-3500**

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188		
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4. TITLE AND SUBTITLE Post-Closure Inspection Report for Landfills L3, M11 and M13 for the 2008 Performance-Based Acquisition for Environmental Remediation, Joliet Army Ammunition Plant, Joliet, Illinois			5a. CONTRACT NUMBER W91ZLK-05-D-0012		
			5b. GRANT NUMBER NA		
			5c. PROGRAM ELEMENT NUMBER NA		
6. AUTHOR(S) TolTest, Inc.			5d. PROJECT NUMBER Delivery Order 0001		
			5e. TASK NUMBER NA		
			5f. WORK UNIT NUMBER NA		
PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) TolTest, Inc. 1480 Ford Street Maumee, OH 44087			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) USAEC - Louisville District Aberdeen Proving Ground – W91ZLK 4118 Susquehanna Ave Aberdeen Proving Ground, MD 21005-3013			10. SPONSOR/MONITOR'S ACRONYM(S) CELRL-ED-EE		
			11. SPONSOR/MONITOR'S REPORT NUMBER NA		
12. DISTRIBUTION/AVAILABILITY STATEMENT Reference Distribution Page					
13. SUPPLEMENTARY NOTES None.					
14. ABSTRACT This Post-Closure Inspection report presents TolTest's findings for the conditions at landfills L3, M11 and M13 pursuant to the requirements of the Performance-Based Contract for Environmental Remediation at the Joliet Army Ammunition Plant.					
15. SUBJECT TERMS Landfill, Inspection Report, L3, M11, M13					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18 NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
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POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13

**for the Performance-Based Acquisition of
Environmental Remediation Services at
Joliet Army Ammunition Plant
Joliet, Illinois**

Submitted to:



**US Army Contracting Agency
APG Directorate of Contracting - AEC Team
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012
Delivery Order No. 0001**

TolTest Project Number: 22271.01

Submitted by:



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April 2013

DOCUMENT DISTRIBUTION
for the
Post-Closure Inspection Report for Landfills
L3, M11, and M13
for the Performance-Based Acquisition of
Environmental Remediation
Joliet Army Ammunition Plant
Joliet, Illinois

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LIST OF ACRONYMS

GMZ Ground Water Monitoring Zone

IAC Illinois Administrative Code

JOAAP Joliet Army Ammunition Plant

L3 JOAAP Landfill L3

M11 JOAAP Landfill M11

M13 JOAAP Landfill M13

RA Remedial Action

RG Remedial Goal

USAEC United States Army Environmental Command

POST-CLOSURE INSPECTION REPORT

1.0 Introduction

This document has been prepared for the United States Army Environmental Command to provide documentation of the conditions of three landfills (L3, M11, and M13) located at the former Joliet Army Ammunition Plant (JOAAP).

Post-closure monitoring requirements for Landfills L3, M11 and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed; and
- Keep survey points protected and visible to facilitate identification in the future.

1.1 Landfill Cover Maintenance

According to IAC, the Landfills L3, M11 and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover;
- Erosion features;
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring; and
- Debris or blockage of drainage structures.

Any damages or changes noted will be repaired to comply with the final design specifications for the cover.

Site inspections were conducted on 10 April 2013 for landfill M13, M11 and L3. This report includes copies of the inspection checklist, photographs, recommendations, and conclusions. The Post-Closure Inspection Checklists are found in Attachment A, and Inspection Photographs are found in Attachment B.

2.0 Landfill Descriptions

2.1 Landfill L3

Landfill L3 is located on the western edge of the Site L3 GMZ on the east bank of Prairie Creek. The GMZ comprises approximately 50 acres used as a demolition area directly southwest of Site L2, of which the landfill occupies only 3.32 acres. The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the site as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. The remedy selected for the consolidated area along Prairie Creek was capping to form Landfill L3. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and quickly be discharged as the groundwater flows upward into the surface water body.

2.1.1 Monitoring Locations

Both groundwater and surface water sample points are monitored at Landfill L3 during spring and fall sampling rounds as follows:

- Upgradient Locations
 - SW004 (Surface location where Prairie Creek first touches the L3 GMZ boundary and upstream of the storm water outfall, spring only).
- Downgradient Locations
 - MW410
 - MW412
 - MW630
 - MW631
 - MW633
 - SW777 (Surface water location in Prairie Creek near the L3 GMZ boundary)
 - SW557 (Surface water location in Prairie Creek just upstream of the landfill drainage swale discharge)
 - SW558 (Surface water location at the constructed drainage swale along the southwest side of the newly constructed landfill)

2.2 Landfill M11

Landfill M11 is located in the southwestern portion of the manufacturing side of JOAAP. The GMZ comprises approximately 133 acres. Site M11 was divided into two sections by School House Road and bordered on the west by West Patrol Road. M11 north encompassed approximately 10.5 acres of former gravel pits that were mined and filled with waste. M11 south, a former gravel pit, encompassed approximately 5.6 acres that was also mined and filled with waste. The remedy chosen for Landfill M11 was waste consolidation and capping. Implementation of the remedy began in 2006 and was completed in 2008.

The current conceptual site model is that Landfill M11 is believed to contain manganese and sulfate containing waste that could potentially contaminate underlying groundwater and migrate beyond the GMZ.

With the implementation of the RA at Site M11, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill thus, preventing groundwater contamination.

2.2.1 Monitoring Locations

Groundwater sample points are monitored at Landfill M11 in fall as follows:

- Upgradient Locations
 - MW802
 - MW803
- Downgradient Locations

- MW333
- MW334
- MW335
- MW336
- MW804
- MW805

2.3 Landfill M13

Landfill M13 comprises approximately 106 acres of the central portion of the MFG Area known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area. Disposal activities were confined to four discrete areas on the site, none of which extended beyond 12 acres in size. Historical records indicate landfill disposal took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

Soil in the vicinity of the Northern Gravel Pit had been found to contain beryllium, lead, and benzo(a)pyrene as COCs. Explosive compounds that have been observed in groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT. On a single occasion in 1991, antimony and cadmium were reported to be present at concentrations in excess of their respective RGs, but they have not exceeded the RGs since then. It is difficult to determine if the original findings could have resulted from turbid samples since low flow sampling and micro purging techniques are now employed to obtain more representative samples.

The current conceptual site model is that metal and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit.

With the implementation of the RA on the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

2.3.1 Monitoring Locations

Groundwater is monitored quarterly through sample collection and analysis at six monitoring wells:

- Upgradient or background wells
 - MW806
 - MW807
- Downgradient or source control wells
 - MW126R
 - MW362
 - MW808
 - MW809

3.0 Inspection Results

The following are the observations from the landfill inspections conducted at L3, M11, and M13 on 31 April 2013.

3.1 Landfill L3

The perimeter fence and site postings were in good condition. The vegetative cover was well established and no erosion was observed. No woody plants were observed on the landfill cap during the inspection. However, there continues to be woody growth in the rip rap along the perimeter of the landfill. No subsidence was observed nor was there any evidence of damage due to burrowing animals.

Although small areas of the synthetic cap at L3 are exposed due to displacement of the rip rap, the liner is only visible in the sloped, rip rap armoring area, not over any place at the landfill at L3. The L3 landfill appears to be stable and does not appear to be failing.

3.2 Landfill M11

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion was observed. Woody growth was present in the rip rap surrounding the landfill. No woody plants were observed on the landfill cap during the inspection. The rip rap along the perimeter was evenly applied and no erosion channels were detected. There was no evidence of damage due to burrowing animals. The vents were undamaged and appeared to be in working order.

3.3 Landfill M13

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion was observed. No woody plants were observed on the landfill cap during the inspection. The rip rap along the perimeter was evenly applied and no erosion channels were detected. However, there continues to be woody growth in the rip rap. The vents were undamaged and appeared to be in working order. The drainage ditch located on the south side of the landfill has standing water due to poor drainage. The ditch is filling with plants and sediments.

4.0 Conclusions and Recommendations

The deficiencies noted within this report which need to be addressed include the following:

Landfill L3:

- Repair rip rap along Prairie creek. The Army is currently preparing the contract documentation necessary for implementation of the repairs. The rip rap needs to be cleared of woody growth.

Landfill M11:

- Some woody growth was observed in the rip rap on the west side of the landfill. The rip rap needs to be cleared of woody growth.

Landfill M13:

- The rip rap needs to be cleared of woody growth. The impediment to the drainage ditch needs to be addressed to eliminate the retention of surface water.

Attachment A
Post-Closure Inspection Checklists

JOAAP LANDFILL INSPECTION CHECKLIST

Landfill Designation: M11		Date of Inspection: April 10, 2013	
Inspected By: Gary Reside, TolTest Environmental Manager		Weather Conditions: 40 degree	
Names of those present at inspection: Andrew Maly, COR USAEC			
Checklist	Yes	No	Explanation
Site Security			
a) Was fencing, gates and signs in good condition?	√		
b) Were gates locked?		√	Chained shut with no lock
c) Evidence of trespassing		√	
Landfill Cover			
d) Evidence of Settling and/or Ponding?		√	
e) Any desiccation or cracking detected?		√	
f) Erosion around cap?		√	
g) Animal burrowing detected?		√	
Vegetation Condition			
h) Is vegetation well established?	√		
i) Evidence of vegetation detrimental to cap?		√	
Landfill structures			
j) Evidence of damage to monitoring wells?		√	
k) Evidence of damage to gas vents?		√	Connecting bolts tightened
Field Conclusions			
l) Is there an imminent hazard to the integrity of the unit?		√	
m) Are repairs necessary?		√	
Certification			
Inspector Signature: Gary Reside		Printed Name: Gary Reside	
Title: Environmental Manager		Date: April 10, 2013	

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: L3		Date of Inspection: April 10, 2013	
Inspected By: Gary Reside, TolTest Environmental Manager		Weather Conditions: 40 degree	
Names of those present at inspection: Andrew Maly, COR USAEC			
Checklist	Yes	No	Explanation
Site Security			
a) Was fencing, gates and signs in good condition?	√		
b) Were gates locked?	√		
c) Evidence of trespassing		√	
Landfill Cover			
d) Evidence of Settling and/or Ponding?		√	
e) Any desiccation or cracking detected?		√	
f) Erosion around cap?		√	
g) Animal Burrowing detected?		√	
Vegetation Condition			
h) Is vegetation well established?	√		
i) Evidence of vegetation detrimental to cap?		√	
Landfill structures			
j) Evidence of damage to monitoring wells?		√	
k) Evidence of damage to gas vents?		NA	No vents
Field Conclusions			
l) Is there an imminent hazard to the integrity of the unit?		√	
m) Are repairs necessary?	√		Rip Rap on West side needs repairs
Certification			
Inspector Signature: Gary Reside		Printed Name: Gary Reside	
Title: Environmental Manager		Date: April 10, 2013	

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: M13		Date of Inspection: April 10, 2013	
Inspected By: Gary Reside, TolTest Environmental Manager		Weather Conditions: 40 degree	
Names of those present at inspection: Andrew Maly, COR USAEC			
Checklist	Yes	No	Explanation
Site Security			
a. Was fencing, gates and signs in good condition?	√		
b. Were gates locked?	√		
c. Evidence of trespassing		√	
Landfill Cover			
d. Evidence of Settling and/or Ponding?		√	
e. Any desiccation or cracking detected?		√	
f. Erosion around cap?		√	
g. Animal burrowing detected?		√	
Vegetation Condition			
h. Is vegetation well established?	√		
i. Evidence of vegetation detrimental to cap?		√	
Landfill structures			
j. Evidence of damage to monitoring wells?		√	
k. Evidence of damage to gas vents?		√	Connecting bolts needed tightening.
Field Conclusions			
l. Is there an imminent hazard to the integrity of the unit?		√	
m. Are repairs necessary?		√	
Certification			
Inspector Signature:		Printed Name: Gary Reside	
Title: Environmental Manager		Date: April 10, 2013	

Attachment B
Inspection Photographs



M13 Top of landfill looking south



M13 West side looking south



M13 Top of landfill looking North



M13 South side of landfill looking West



M13 Northwest corner



M11 West side looking North



M11 top of landfill looking NW



M11 East side looking toward retention pond.



L3 West side looking South



L3 West side looking North



L3 top of landfill looking South.



L3 East side looking SW.

APPENDIX B
DATA REPORTS

B1 - DATA QUALITY EVALUATION REPORT AND FORM Is



Solutions for Your Site Development,
Construction, and Environmental Projects.

February 25, 2013

Project No. 22271

Revised Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on January 30, 2013 and received by the laboratory on January 30, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-54207.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, volatile organic compounds (VOC) using SW846 Method 8260B, semi-volatile organic compounds (SVOC) using SW846 8270C, metals using SW846 Method 6010B, mercury using SW846 Method 7470A, and sulfate/nitrates using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-M13- GWMW126R	1/30/13	10:15	500-54207-1	1	water	2/11/13
JP-M13- GWMW362	1/30/13	9:40	500-54207-2	1	water	2/11/13
JP-M13- GWMW808	1/30/13	12:25	500-54207-3	1	water	2/11/13
JP-M13- GWMW809	1/30/13	11:35	500-54207-4	1	water	2/11/13

Sample Analysis

1. explosives, VOC, SVOC, metals, sulfate/nitrate
2. sulfate
3. VOC

OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010) (QAPP)*, the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, *DoD Quality Systems Manual Version 4 Draft*, (January 2009), *Louisville Chemistry Guideline*, (LCG) (June 2002), and U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, daily tune requirements, internal standards, surrogates, laboratory control samples (LCS), method blanks, trip blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.



SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8260B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

- Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

- Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).
- In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990 which meets quality control requirements.
- The average response factors (RRF) for all compounds in system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent differences (%D) were within quality control requirements of less than or equal to 25% for each individual compound with the following exceptions.
- The %D for cyclohexanone in the ICV 280-153382/15 exceeded the quality control limit. This compound is not a target analyte, therefore the samples are not affected. The %D for 2-pentanone, 2-chloroethyl vinyl ether, and cis-1,4-dichloro-2-butene in the ICV 280-153688/42 exceeded the quality control limit. In addition, the %D for 2-pentanone and cis-1,4-dichloro-2-butene exceeded the quality control limit in ICV 280-156816/15. These compounds are not target analytes. The %D for vinyl acetate exceeded the quality control limit in ICV 280-156816/15. Consistent with the QAPP Worksheet #28 and referenced laboratory SOP Table B-3 the data should be qualified as follows:

Date	Compound	%D	Associated Samples	Flag
1/23/13	Vinyl acetate	26.3%	JP-M13-GWMW808 JP-M13-GWMW809	R

Continuing Calibration

- The continuing calibration verification samples (CCV) were run every twelve hours consistent with the method, DoD QSM, and U.S. EPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.

- The %D for all compounds were within the quality control requirements of less than or equal to 20%. The %D for the CCC and the continuing calibration response factors for SPCC were with quality control limits with the following exception.
- The %D for acrolein in the CCV 280-159074/2 analyzed on 2/7/13 at 08:18 exceeded the quality control limit. The %D in the CCV 280-159074/3 analyzed on 2/7/13 at 08:39 exceeded the quality control limit for 2-chloroethyl vinyl ether; these compounds were not target analytes.
- The %D for trichlorofluoromethane, 2,2-dichloropropane, carbon tetrachloride, 2-hexanone, cyclohexanone, naphthalene in the CCV 280-158850/2 analyzed on 2/6/13 at 08:26 exceeded the quality control limit. Cyclohexanone was not a target compound, and the remaining compounds were not detected in the samples and should be qualified in samples JP-M13-GWMW-808 and JP-M13-GWMW-809. In addition, the %D for ethyl ether, 2,2-dichloro-1,1,1-trifluoroethane, hexane, tetrahydrofuran, 2-chloroethyl vinyl ether, and ethyl methacrylate in the CCV 280-158850/3 exceeded the quality control limit; these compounds were not target analytes. Consistent with the QAPP Worksheet #28 and referenced laboratory SOP Table B-3 the data should be qualified as follows:

Date	Compound	%D	Associated Samples	Flag
2/6/13 instrument VMS_R1	Trichlorofluoromethane	23.6%	JP-M13-GWMW809	J (all detects)
	2,2-dichloropropane	34.9%	JP-M13-GWMW808	UJ (all non-
	Carbon tetrachloride	34.0%		detects)
	2-hexanone	29.9%		
	naphthalene	24.8%		

Blanks

- Acetone and methylene chloride were detected in the method blank batch 280-158850 at a concentration between the method detection limit and the reporting limit and less than half the reporting limit. Associated samples included JP-M13-GWMW808 and JP-M13-GWMW809. Acetone was detected in two samples JP-M13-GWMW808 and JP-M13-GWMW809 at concentrations between the method detection limit (MDL) and reporting limit (RL). In addition, methylene chloride was detected in JP-M13-GWMW808 at a concentration between the MDL and RL. The remaining analytes were not detected in the method blank. Acetone and methylene chloride are common laboratory contaminants, the laboratory qualified the sample results for these compounds with a "B" flag. The method blank batch 280-159074 met quality control requirements, and associated samples included JP-M13-GWMW-126R and JP-M13-GWMW362.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The matrix spike and matrix spike duplicate samples were not analyzed. The data are not affected.

Laboratory Control Samples

- The %R for the laboratory control samples (LCS) were within quality control limits.

Internal Standards

- The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 8270C

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

- Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

- Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).
- In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.
- The average response factors (RRF) for all compounds in system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent differences (%D) were within quality control requirements of less than or equal to 25% for each individual compound.

Continuing Calibration

- The continuing calibration verification samples (CCV) were run every twelve hours consistent with the method, DoD QSM, and U.S. EPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.
- The %D for all compounds were within the quality control requirements of less than or equal to 20% with the following exceptions.
- The %D in the CCV sample 280-159114/2 for benzoic acid exceeded the quality control limit. Associated samples included JP-M13-GWMW808, JP-M13-GWM809, JP-M13-GWMW126R, JP-M13-GWMW362. The samples should be qualified "J" for these analytes for positive results.

Date	Compound	%D	Associated Samples	Flag
2/7/13	benzoic acid	27.8%	JP-M13-GWMW808 JP-M13-GWMW809 JP-M13 GWMW126R JP-M13-GWMW362	J (all detects) UJ (all non-detects)

- The continuing calibration response factors for SPCC were within quality control limits, and the %D for the CCC met the quality control requirements.

Blanks

- The method blanks met quality control requirements.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this sample group. The data are not affected.

Laboratory Control Samples

- The %R for the laboratory control samples (LCS/LCSD) were within quality control limits.

Internal Standards

- The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 6010B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Aluminum and thallium were detected in the method blank at a concentration between the method detection limit and reporting limit and less than one half the reporting limit. Aluminum was not detected in the samples. Thallium was detected in the samples at concentrations less than the reporting limit and less than

five times the method blank concentration and should be qualified with a “B”. The laboratory qualified the sample results with a “B” flag for thallium.

Compound	QC Sample	Method Blank Concentration	Associated Samples	Sample Concentration	Flag to be removed
Thallium	Method blank	0.00603 mg/L	JP-M13-GWMW808 Thallium	0.0087 mg/L	Qualify B
			JP-M13-GWMW809 Thallium	0.0065 mg/L	Qualify B
			JP-M13-GW126R Thallium	0.012 mg/L	Qualify B
			JP-M13-GWMW362 Thallim	0.012 mg/L	Qualify B

-The initial and continuing calibration blanks met method quality control requirements. Metals that were detected in the blanks were less than one half the reporting limit.

Interelement Check Standard

- The interference check standard (ICS-A and ICS-AB) met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The matrix spike and matrix spike duplicate (MS/MSD) sample percent recoveries (%R) were within quality control requirements with the following exception: the %R in the MS and MSD exceeded the upper quality control limit for cadmium. The %RPD was within the quality control limits.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Quality Control/Method Reporting Limit Check

- The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 7470A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- The initial, method, and continuing calibration blanks met method quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The MS/MSD %R were within quality control requirements.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on both columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements on both columns.

Blanks

- 2-Amino-4,6-dinitrotoluene was detected in the method blank at a concentration between the MDL and RL, and less than one half the RL on the primary column batch 280-158375. In addition, 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene were detected in the method blank at concentrations between the MDL and RL, and less than one half the RL on the secondary column. The remaining analytes were not detected in the method blank. 2-Amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene were detected above the RL in sample JP-M13-GWMW-362. The sample was not qualified for these analytes since method blank concentrations were less than one half the RL. The laboratory qualified the sample with a "B" flag for 2-amino-4,6-dinitrotoluene.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements with the following exceptions: the surrogate %R was below the lower quality control limit on the primary column in sample JP-M13-

GWMW362 and the surrogate %R was above the upper quality control limit on the secondary column in sample JP-M13-GWMW809. In each case where the surrogate %R exceeded the quality control limit on one column, the %R was within the quality control limits on the other column. Sample results for JP-M13-GWMW-362 should be qualified with “J” flag since the poor surrogate recovery was on the primary column.

Date	Compound	%R	Associated Samples	Flag
2/4/2013	Surrogate 1,2-Dinitrobenzene	73%	JP-M13-GWMW362	J for detects and UJ for non-detects

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this sample group. The data are not affected.

Laboratory Control Samples

- The %R for the LCS were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for retention times, secondary column confirmation, dilutions, and RPD between the primary and secondary columns with the following exception.
- The RPD between the primary and secondary columns exceeded the quality control limit for 2,6-dinitrotoluene in sample JP-M13-GWMW-362. This analyte should be qualified with a “J” in this sample.

Date	Compound	%RPD	Associated Samples	Flag
2/4/2013	2,6-dinitrotoluene	56.5%	JP-M13-GWMW362	J

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Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method blank analysis met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The MS/MSD sample %R was within quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-159074	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS1322.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/07/2013 1107			Final Weight/Volume:	20 mL
Prep Date:	02/07/2013 1107				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10		1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-159074	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS1322.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/07/2013 1107			Final Weight/Volume:	20 mL
Prep Date:	02/07/2013 1107				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	103		75 - 120
Dibromofluoromethane (Surr)	104		85 - 115
1,2-Dichloroethane-d4 (Surr)	107		70 - 120
Toluene-d8 (Surr)	98		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-159074	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS1323.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/07/2013 1127			Final Weight/Volume:	20 mL
Prep Date:	02/07/2013 1127				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10		1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	0.42	J	0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-159074	Instrument ID:	VMS_MS1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	MS1323.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/07/2013 1127			Final Weight/Volume:	20 mL
Prep Date:	02/07/2013 1127				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	0.23	J	0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	100		75 - 120
Dibromofluoromethane (Surr)	99		85 - 115
1,2-Dichloroethane-d4 (Surr)	101		70 - 120
Toluene-d8 (Surr)	96		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158850	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R2281.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1634			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1634				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	7.3	J B	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0	UJ	0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0	UJ	0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0	UJ	0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	0.34	J B	0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0	UJ	0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158850	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R2281.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1634			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1634				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0	UJ	0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0	R	0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	83		75 - 120
Dibromofluoromethane (Surr)	113		85 - 115
1,2-Dichloroethane-d4 (Surr)	118		70 - 120
Toluene-d8 (Surr)	87		85 - 120

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158850	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R2268.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1136			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1136				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	2.5	J B	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0	UJ	0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0	UJ	0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0	UJ	1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0	UJ	0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158850	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R2268.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1136			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1136				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0	UJ	0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0	R	0.94	3.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene (Surr)	87		75 - 120	
Dibromofluoromethane (Surr)	109		85 - 115	
1,2-Dichloroethane-d4 (Surr)	113		70 - 120	
Toluene-d8 (Surr)	85		85 - 120	

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6410.D
Dilution:	1.0			Initial Weight/Volume:	1046.5 mL
Analysis Date:	02/07/2013 1401			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.6		0.27	9.6
Acenaphthylene	<9.6		0.47	9.6
Anthracene	<9.6		0.40	9.6
Benidine	<190		48	190
Benzo[a]anthracene	<9.6		0.33	9.6
Benzo[a]pyrene	<9.6		0.30	9.6
Benzo[b]fluoranthene	<9.6		0.51	9.6
Benzo[g,h,i]perylene	<9.6		0.48	9.6
Benzoic acid	<76	UJ	9.6	76
Benzo[k]fluoranthene	<9.6		0.44	9.6
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.6		0.93	9.6
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	<9.6		0.54	9.6
4-Bromophenyl phenyl ether	<9.6		0.41	9.6
Butyl benzyl phthalate	<19		0.96	19
Carbazole	<9.6		0.41	9.6
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.6		0.25	9.6
2-Chlorophenol	<9.6		1.9	9.6
4-Chlorophenyl phenyl ether	<9.6		1.6	9.6
Chrysene	<9.6		0.52	9.6
Dibenz(a,h)anthracene	<9.6		0.49	9.6
Dibenzofuran	<9.6		0.28	9.6
1,2-Dichlorobenzene	<9.6		0.22	9.6
1,3-Dichlorobenzene	<9.6		0.29	9.6
1,4-Dichlorobenzene	<9.6		0.31	9.6
3,3'-Dichlorobenzidine	<48		1.9	48
2,4-Dichlorophenol	<9.6		0.61	9.6
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.6		0.55	9.6
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.6	76
2,4-Dinitrotoluene	<19		1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.6		0.22	9.6
Fluoranthene	<19		0.19	19
Fluorene	<9.6		0.30	9.6
Hexachlorobenzene	<9.6		0.63	9.6
Hexachlorobutadiene	<29		3.2	29
Hexachloroethane	<9.6		2.0	9.6
Indeno[1,2,3-cd]pyrene	<9.6		0.62	9.6

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6410.D
Dilution:	1.0			Initial Weight/Volume:	1046.5 mL
Analysis Date:	02/07/2013 1401			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.6		0.20	9.6
2-Methylnaphthalene	<9.6		0.28	9.6
2-Methylphenol	<9.6		0.94	9.6
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.6		0.28	9.6
2-Nitroaniline	<48		1.7	48
3-Nitroaniline	<48		1.9	48
4-Nitroaniline	<48		1.9	48
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<48		1.2	48
N-Nitrosodimethylamine	<9.6		0.28	9.6
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.6		0.42	9.6
2,2'-oxybis[1-chloropropane]	<9.6		0.27	9.6
Pentachlorophenol	<76		19	76
Phenanthrene	<9.6		0.25	9.6
Phenol	<9.6		1.9	9.6
Pyrene	<9.6		0.35	9.6
1,2,4-Trichlorobenzene	<9.6		0.27	9.6
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.28	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	79		50 - 110
2-Fluorophenol (Surr)	75		20 - 110
Nitrobenzene-d5 (Surr)	81		40 - 110
Phenol-d5 (Surr)	79		10 - 115
Terphenyl-d14 (Surr)	111		50 - 135
2,4,6-Tribromophenol (Surr)	84		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6411.D
Dilution:	1.0			Initial Weight/Volume:	1054.7 mL
Analysis Date:	02/07/2013 1422			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.5		0.27	9.5
Acenaphthylene	<9.5		0.46	9.5
Anthracene	<9.5		0.40	9.5
Benzidine	<190		47	190
Benzo[a]anthracene	<9.5		0.33	9.5
Benzo[a]pyrene	<9.5		0.29	9.5
Benzo[b]fluoranthene	<9.5		0.50	9.5
Benzo[g,h,i]perylene	<9.5		0.47	9.5
Benzoic acid	<76	UJ	9.5	76
Benzo[k]fluoranthene	<9.5		0.44	9.5
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.5		0.92	9.5
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	<9.5		0.53	9.5
4-Bromophenyl phenyl ether	<9.5		0.41	9.5
Butyl benzyl phthalate	<19		0.95	19
Carbazole	<9.5		0.41	9.5
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.5		0.25	9.5
2-Chlorophenol	<9.5		1.9	9.5
4-Chlorophenyl phenyl ether	<9.5		1.6	9.5
Chrysene	<9.5		0.51	9.5
Dibenz(a,h)anthracene	<9.5		0.48	9.5
Dibenzofuran	<9.5		0.27	9.5
1,2-Dichlorobenzene	<9.5		0.22	9.5
1,3-Dichlorobenzene	<9.5		0.28	9.5
1,4-Dichlorobenzene	<9.5		0.30	9.5
3,3'-Dichlorobenzidine	<47		1.9	47
2,4-Dichlorophenol	<9.5		0.61	9.5
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.5		0.55	9.5
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.5	76
2,4-Dinitrotoluene	4.3	J	1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.5		0.22	9.5
Fluoranthene	<19		0.19	19
Fluorene	<9.5		0.29	9.5
Hexachlorobenzene	<9.5		0.63	9.5
Hexachlorobutadiene	<28		3.1	28
Hexachloroethane	<9.5		2.0	9.5
Indeno[1,2,3-cd]pyrene	<9.5		0.62	9.5

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6411.D
Dilution:	1.0			Initial Weight/Volume:	1054.7 mL
Analysis Date:	02/07/2013 1422			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.5		0.20	9.5
2-Methylnaphthalene	<9.5		0.27	9.5
2-Methylphenol	<9.5		0.93	9.5
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.5		0.27	9.5
2-Nitroaniline	<47		1.6	47
3-Nitroaniline	<47		1.9	47
4-Nitroaniline	<47		1.9	47
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<47		1.2	47
N-Nitrosodimethylamine	<9.5		0.27	9.5
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.5		0.42	9.5
2,2'-oxybis[1-chloropropane]	<9.5		0.27	9.5
Pentachlorophenol	<76		19	76
Phenanthrene	<9.5		0.25	9.5
Phenol	<9.5		1.9	9.5
Pyrene	<9.5		0.35	9.5
1,2,4-Trichlorobenzene	<9.5		0.27	9.5
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.27	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	74		50 - 110
2-Fluorophenol (Surr)	69		20 - 110
Nitrobenzene-d5 (Surr)	73		40 - 110
Phenol-d5 (Surr)	72		10 - 115
Terphenyl-d14 (Surr)	109		50 - 135
2,4,6-Tribromophenol (Surr)	89		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6412.D
Dilution:	1.0			Initial Weight/Volume:	1056.4 mL
Analysis Date:	02/07/2013 1442			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.5		0.27	9.5
Acenaphthylene	<9.5		0.46	9.5
Anthracene	<9.5		0.40	9.5
Benzidine	<190		47	190
Benzo[a]anthracene	<9.5		0.33	9.5
Benzo[a]pyrene	<9.5		0.29	9.5
Benzo[b]fluoranthene	<9.5		0.50	9.5
Benzo[g,h,i]perylene	<9.5		0.47	9.5
Benzoic acid	<76	UJ	9.5	76
Benzo[k]fluoranthene	<9.5		0.44	9.5
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.5		0.92	9.5
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	2.0	J	0.53	9.5
4-Bromophenyl phenyl ether	<9.5		0.41	9.5
Butyl benzyl phthalate	<19		0.95	19
Carbazole	<9.5		0.41	9.5
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.5		0.25	9.5
2-Chlorophenol	<9.5		1.9	9.5
4-Chlorophenyl phenyl ether	<9.5		1.6	9.5
Chrysene	<9.5		0.51	9.5
Dibenz(a,h)anthracene	<9.5		0.48	9.5
Dibenzofuran	<9.5		0.27	9.5
1,2-Dichlorobenzene	<9.5		0.22	9.5
1,3-Dichlorobenzene	<9.5		0.28	9.5
1,4-Dichlorobenzene	<9.5		0.30	9.5
3,3'-Dichlorobenzidine	<47		1.9	47
2,4-Dichlorophenol	<9.5		0.61	9.5
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.5		0.55	9.5
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.5	76
2,4-Dinitrotoluene	<19		1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.5		0.22	9.5
Fluoranthene	<19		0.19	19
Fluorene	<9.5		0.29	9.5
Hexachlorobenzene	<9.5		0.62	9.5
Hexachlorobutadiene	<28		3.1	28
Hexachloroethane	<9.5		2.0	9.5
Indeno[1,2,3-cd]pyrene	<9.5		0.62	9.5

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6412.D
Dilution:	1.0			Initial Weight/Volume:	1056.4 mL
Analysis Date:	02/07/2013 1442			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.5		0.20	9.5
2-Methylnaphthalene	<9.5		0.27	9.5
2-Methylphenol	<9.5		0.93	9.5
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.5		0.27	9.5
2-Nitroaniline	<47		1.6	47
3-Nitroaniline	<47		1.9	47
4-Nitroaniline	<47		1.9	47
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<47		1.2	47
N-Nitrosodimethylamine	<9.5		0.27	9.5
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.5		0.42	9.5
2,2'-oxybis[1-chloropropane]	<9.5		0.27	9.5
Pentachlorophenol	<76		19	76
Phenanthrene	<9.5		0.25	9.5
Phenol	<9.5		1.9	9.5
Pyrene	<9.5		0.35	9.5
1,2,4-Trichlorobenzene	<9.5		0.27	9.5
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.27	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	86		50 - 110
2-Fluorophenol (Surr)	83		20 - 110
Nitrobenzene-d5 (Surr)	89		40 - 110
Phenol-d5 (Surr)	87		10 - 115
Terphenyl-d14 (Surr)	97		50 - 135
2,4,6-Tribromophenol (Surr)	100		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6413.D
Dilution:	1.0			Initial Weight/Volume:	1058.8 mL
Analysis Date:	02/07/2013 1503			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.4	UJ	0.26	9.4
Acenaphthylene	<9.4		0.46	9.4
Anthracene	<9.4		0.40	9.4
Benidine	<190		47	190
Benzo[a]anthracene	<9.4		0.33	9.4
Benzo[a]pyrene	<9.4		0.29	9.4
Benzo[b]fluoranthene	<9.4		0.50	9.4
Benzo[g,h,i]perylene	<9.4		0.47	9.4
Benzoic acid	<76		9.4	76
Benzo[k]fluoranthene	<9.4		0.43	9.4
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.4		0.92	9.4
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	<9.4		0.53	9.4
4-Bromophenyl phenyl ether	<9.4		0.41	9.4
Butyl benzyl phthalate	<19		0.94	19
Carbazole	<9.4		0.41	9.4
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.4		0.25	9.4
2-Chlorophenol	<9.4		1.9	9.4
4-Chlorophenyl phenyl ether	<9.4		1.6	9.4
Chrysene	<9.4		0.51	9.4
Dibenz(a,h)anthracene	<9.4		0.48	9.4
Dibenzofuran	<9.4		0.27	9.4
1,2-Dichlorobenzene	<9.4		0.22	9.4
1,3-Dichlorobenzene	<9.4		0.28	9.4
1,4-Dichlorobenzene	<9.4		0.30	9.4
3,3'-Dichlorobenzidine	<47		1.9	47
2,4-Dichlorophenol	<9.4		0.60	9.4
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.4		0.55	9.4
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.4	76
2,4-Dinitrotoluene	<19		1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.4		0.22	9.4
Fluoranthene	<19		0.19	19
Fluorene	<9.4		0.29	9.4
Hexachlorobenzene	<9.4		0.62	9.4
Hexachlorobutadiene	<28		3.1	28
Hexachloroethane	<9.4		2.0	9.4
Indeno[1,2,3-cd]pyrene	<9.4		0.61	9.4

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159114	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158379	Lab File ID:	D6413.D
Dilution:	1.0			Initial Weight/Volume:	1058.8 mL
Analysis Date:	02/07/2013 1503			Final Weight/Volume:	1000 uL
Prep Date:	02/01/2013 1420			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.4		0.20	9.4
2-Methylnaphthalene	<9.4		0.27	9.4
2-Methylphenol	<9.4		0.93	9.4
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.4		0.27	9.4
2-Nitroaniline	<47		1.6	47
3-Nitroaniline	<47		1.9	47
4-Nitroaniline	<47		1.9	47
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<47		1.2	47
N-Nitrosodimethylamine	<9.4		0.27	9.4
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.4		0.42	9.4
2,2'-oxybis[1-chloropropane]	<9.4		0.26	9.4
Pentachlorophenol	<76		19	76
Phenanthrene	<9.4		0.25	9.4
Phenol	<9.4		1.9	9.4
Pyrene	<9.4		0.35	9.4
1,2,4-Trichlorobenzene	<9.4		0.26	9.4
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.27	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	62		50 - 110
2-Fluorophenol (Surr)	61		20 - 110
Nitrobenzene-d5 (Surr)	63		40 - 110
Phenol-d5 (Surr)	64		10 - 115
Terphenyl-d14 (Surr)	106		50 - 135
2,4,6-Tribromophenol (Surr)	78		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158480	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	491.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/04/2013 1746			Injection Volume:	100 µL
Prep Date:	02/02/2013 1047			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.052	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	<0.41		0.085	0.41
2,6-Dinitrotoluene	<0.20		0.066	0.20
HMX	<0.41		0.089	0.41
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.093	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.081	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.41		0.074	0.41

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	91		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158480	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	487.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/04/2013 1812			Injection Volume:	100 uL
Prep Date:	02/02/2013 1047			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	1.2	B	JJ	0.052
4-Amino-2,6-dinitrotoluene	0.97	p	JJ	0.059
1,3-Dinitrobenzene	<0.41		UJ	0.091
2,4-Dinitrotoluene	7.3		JJ	0.086
2,6-Dinitrotoluene	0.33	p	JJ	0.066
HMX	<0.41		UJ	0.090
m-Nitrotoluene	<0.41		UJ	0.085
Nitrobenzene	<0.41			0.093
o-Nitrotoluene	<0.41			0.088
p-Nitrotoluene	<1.0			0.21
2,4,6-Trinitrotoluene	<0.41		UJ	0.074
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	73	X	75 - 118	

JR 7/19/ 2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158685	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	487.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/05/2013 1719			Injection Volume:	100 µL
Prep Date:	02/02/2013 1047			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
RDX	<0.21		0.054	0.21
Tetryl	<0.25		0.081	0.25
1,3,5-Trinitrobenzene	<1.0		0.21	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158685	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	487.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/05/2013 1719			Injection Volume:	100 µL
Prep Date:	02/02/2013 1047			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158480	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	490.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/04/2013 1838			Injection Volume:	100 µL
Prep Date:	02/02/2013 1047			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.052	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	<0.41		0.085	0.41
2,6-Dinitrotoluene	<0.20		0.066	0.20
HMX	<0.41		0.089	0.41
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.093	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.081	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.41		0.074	0.41

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	90		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158480	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	491.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/04/2013 1905			Injection Volume:	100 µL
Prep Date:	02/02/2013 1047			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.052	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	0.10	J	0.085	0.41
2,6-Dinitrotoluene	<0.20		0.066	0.20
HMX	<0.41		0.089	0.41
m-Nitrotoluene	<0.41		0.085	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
1,3,5-Trinitrobenzene	<1.0		0.20	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158685	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	491.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/05/2013 1758			Injection Volume:	100 µL
Prep Date:	02/02/2013 1047			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	<0.41		0.093	0.41
Tetryl	<0.24		0.081	0.24
2,4,6-Trinitrotoluene	<0.41		0.074	0.41

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158685	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-158375	Initial Weight/Volume:	491.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/05/2013 1758			Injection Volume:	100 uL
Prep Date:	02/02/2013 1047			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	327	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-158680	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	26A020413.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/04/2013 1614			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Arsenic	<0.025		0.0044	0.025
Barium	0.058		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	<0.0050		0.00045	0.0050
Calcium	79		0.035	1.0
Chromium	<0.015	^	0.00066	0.015
Cobalt	<0.015		0.0012	0.015
Iron	<0.10		0.022	0.10
Lead	<0.015		0.0026	0.015
Magnesium	49		0.011	0.50
Manganese	0.022	^	0.00025	0.010
Potassium	3.1		0.24	3.0
Silver	<0.015		0.00093	0.015
Thallium	0.012	J B	0.0049	0.040
Vanadium	<0.015		0.0011	0.015
Zinc	0.0066	J	0.0045	0.15

Analysis Method:	6010B	Analysis Batch:	280-158877	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A1020513.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/05/2013 1411			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Antimony	<0.020		0.0031	0.020
Copper	0.0017	J ^	0.0014	0.015
Nickel	0.0018	J ^	0.0013	0.040
Sodium	50		0.092	5.0

Analysis Method:	6010B	Analysis Batch:	280-159085	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A2020613.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/06/2013 1701			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Selenium	<0.022		0.0049	0.022

7470A Mercury (CVAA)-Dissolved

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

7470A Mercury (CVAA)-Dissolved

Analysis Method: 7470A

Analysis Batch: 280-158566

Instrument ID: MT_033

Prep Method: 7470A

Prep Batch: 280-158201

Lab File ID: 130201aa.txt

Dilution: 1.0

Initial Weight/Volume: 30 mL

Analysis Date: 02/01/2013 2054

Final Weight/Volume: 30 mL

Prep Date: 02/01/2013 1200

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-158680	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	26A020413.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/04/2013 1626			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Arsenic	<0.025		0.0044	0.025
Barium	0.051		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	<0.0050		0.00045	0.0050
Calcium	180		0.035	1.0
Chromium	0.00067	J ^	0.00066	0.015
Cobalt	0.0012	J	0.0012	0.015
Iron	<0.10		0.022	0.10
Lead	<0.015		0.0026	0.015
Magnesium	110		0.011	0.50
Manganese	0.18	^	0.00025	0.010
Potassium	7.8		0.24	3.0
Silver	<0.015		0.00093	0.015
Thallium	0.012	J B	0.0049	0.040
Vanadium	<0.015		0.0011	0.015
Zinc	0.0046	J	0.0045	0.15

Analysis Method:	6010B	Analysis Batch:	280-158877	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A1020513.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/05/2013 1422			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Antimony	<0.020		0.0031	0.020
Copper	0.0022	J ^	0.0014	0.015
Nickel	0.0065	J ^	0.0013	0.040
Sodium	320		0.092	5.0

Analysis Method:	6010B	Analysis Batch:	280-159085	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A2020613.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/06/2013 1713			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Selenium	<0.022		0.0049	0.022

7470A Mercury (CVAA)-Dissolved

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

7470A Mercury (CVAA)-Dissolved

Analysis Method: 7470A

Analysis Batch: 280-158566

Instrument ID: MT_033

Prep Method: 7470A

Prep Batch: 280-158201

Lab File ID: 130201aa.txt

Dilution: 1.0

Initial Weight/Volume: 30 mL

Analysis Date: 02/01/2013 2103

Final Weight/Volume: 30 mL

Prep Date: 02/01/2013 1200

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-158680	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	26A020413.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/04/2013 1628			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Arsenic	<0.025		0.0044	0.025
Barium	0.23		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	0.00070	J	0.00045	0.0050
Calcium	170		0.035	1.0
Chromium	<0.015	^	0.00066	0.015
Cobalt	0.0079	J	0.0012	0.015
Iron	1.9		0.022	0.10
Lead	<0.015		0.0026	0.015
Magnesium	88		0.011	0.50
Manganese	0.85	^	0.00025	0.010
Potassium	13		0.24	3.0
Silver	<0.015		0.00093	0.015
Thallium	0.0087	J B	0.0049	0.040
Vanadium	0.0029	J	0.0011	0.015
Zinc	0.0095	J	0.0045	0.15

Analysis Method:	6010B	Analysis Batch:	280-158877	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A1020513.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/05/2013 1424			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Antimony	<0.020		0.0031	0.020
Copper	0.0048	J ^	0.0014	0.015
Nickel	0.023	J ^	0.0013	0.040
Sodium	66		0.092	5.0

Analysis Method:	6010B	Analysis Batch:	280-159085	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A2020613.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/06/2013 1715			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Selenium	<0.022		0.0049	0.022

7470A Mercury (CVAA)-Dissolved

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

7470A Mercury (CVAA)-Dissolved

Analysis Method: 7470A

Analysis Batch: 280-158566

Instrument ID: MT_033

Prep Method: 7470A

Prep Batch: 280-158201

Lab File ID: 130201aa.txt

Dilution: 1.0

Initial Weight/Volume: 30 mL

Analysis Date: 02/01/2013 2106

Final Weight/Volume: 30 mL

Prep Date: 02/01/2013 1200

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Client Matrix: Water

Date Sampled: 01/30/2013 1138

Date Received: 01/30/2013 1530

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-158680	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	26A020413.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/04/2013 1631			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Arsenic	<0.025		0.0044	0.025
Barium	0.028		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	<0.0050		0.00045	0.0050
Calcium	42		0.035	1.0
Chromium	<0.015	^	0.00066	0.015
Cobalt	<0.015		0.0012	0.015
Iron	0.042	J	0.022	0.10
Lead	<0.015		0.0026	0.015
Magnesium	32		0.011	0.50
Manganese	0.012	^	0.00025	0.010
Potassium	3.2		0.24	3.0
Silver	<0.015		0.00093	0.015
Thallium	0.0065	J B	0.0049	0.040
Vanadium	<0.015		0.0011	0.015
Zinc	<0.15		0.0045	0.15

Analysis Method:	6010B	Analysis Batch:	280-158877	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A1020513.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/05/2013 1427			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Antimony	<0.020		0.0031	0.020
Copper	<0.015	^	0.0014	0.015
Nickel	0.0013	J ^	0.0013	0.040
Sodium	21		0.092	5.0

Analysis Method:	6010B	Analysis Batch:	280-159085	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-158277	Lab File ID:	25A2020613.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/06/2013 1717			Final Weight/Volume:	50 mL
Prep Date:	02/04/2013 0830				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Selenium	<0.022		0.0049	0.022

7470A Mercury (CVAA)-Dissolved

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

7470A Mercury (CVAA)-Dissolved

Analysis Method: 7470A

Analysis Batch: 280-158566

Instrument ID: MT_033

Prep Method: 7470A

Prep Batch: 280-158201

Lab File ID: 130201aa.txt

Dilution: 1.0

Initial Weight/Volume: 30 mL

Analysis Date: 02/01/2013 2108

Final Weight/Volume: 30 mL

Prep Date: 02/01/2013 1200

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

General Chemistry**Client Sample ID:** JP-M13-GWMW126R

Lab Sample ID: 500-54207-1

Date Sampled: 01/30/2013 1015

Client Matrix: Water

Date Received: 01/30/2013 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.072	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-158407	Analysis Date: 01/31/2013 1547					
Sulfate	60		mg/L	1.2	25	5.0	9056A
	Analysis Batch: 280-158408	Analysis Date: 01/31/2013 1744					

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

General Chemistry**Client Sample ID:** JP-M13-GWMW362

Lab Sample ID: 500-54207-2

Date Sampled: 01/30/2013 0940

Client Matrix: Water

Date Received: 01/30/2013 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.077	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-158407	Analysis Date: 01/31/2013 1603					
Sulfate	280		mg/L	4.6	100	20	9056A
	Analysis Batch: 280-158408	Analysis Date: 01/31/2013 1801					

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

General Chemistry**Client Sample ID:** JP-M13-GWMW808

Lab Sample ID: 500-54207-3

Date Sampled: 01/30/2013 1225

Client Matrix: Water

Date Received: 01/30/2013 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	<0.50		mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-158407	Analysis Date: 01/31/2013 1620					
Sulfate	130		mg/L	1.2	25	5.0	9056A
	Analysis Batch: 280-158408	Analysis Date: 01/31/2013 1818					

Analytical Data

Client: Toltest Inc.

Job Number: 500-54207-1

General Chemistry**Client Sample ID: JP-M13-GWMW809**

Lab Sample ID: 500-54207-4

Date Sampled: 01/30/2013 1138

Client Matrix: Water

Date Received: 01/30/2013 1530

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	<0.50		mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-158407	Analysis Date: 01/31/2013 1637					
Sulfate	8.1		mg/L	0.23	5.0	1.0	9056A
	Analysis Batch: 280-158408	Analysis Date: 01/31/2013 1637					



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March 4, 2013

Project No. 22271

Revised Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on January 31, 2013 and received by the laboratory on January 31, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-54239.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, volatile organic compounds (VOC) using SW846 Method 8260B, semi-volatile organic compounds (SVOC) using SW846 8270C, metals using SW846 Method 6010B, mercury using SW846 Method 7470A, and sulfate/nitrates using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-M13- GWMW806	1/3/13	10:23	500-54239-1	1	water	2/20/13
JP-M13- GWMW807	1/31/13	9:33	500-54239-2	1	water	2/20/13
JP-M13- GWMW999	1/31/13	12:00	500-54239-3	1	water	2/20/13

Sample Analysis

1. explosives, VOC, SVOC, metals, sulfate/nitrate
2. sulfate
3. VOC

OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010)* (QAPP), the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, DoD Quality Systems Manual Version 4 Draft, (January 2009), *Louisville Chemistry Guideline*, (LCG) (June 2002), and U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, daily tune requirements, internal standards, surrogates, laboratory control samples (LCS), method blanks, trip blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.



SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8260B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

- Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

- Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).
- In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990 which meets quality control requirements.
- The average response factors (RRF) for all compounds in system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent differences (%D) were within quality control requirements of less than or equal to 25% for each individual compound with the following exceptions.
- The %D for acetonitrile in the ICV 280-149861/15 exceeded the quality control limit. This compound is not a target compound, therefore the samples are not affected. The %D for 2-pentanone and cis-1,4-dichloro-2-butene in the ICV 280-149861/16 exceeded the quality control limit. These compounds are not target compounds, therefore the samples are not affected.

Continuing Calibration

- The continuing calibration verification samples (CCV) were run every twelve hours consistent with the method, DoD QSM, and U.S. EPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.
- The %D for all compounds were within the quality control requirements of less than or equal to 20%. The %D for the CCC and the continuing calibration response factors for SPCC were with quality control limits with the following exception.
- The %D for acrolein, 2-methyl-2-propanol, and cyclohexanone in the CCV 280-158842/2 analyzed on 2/6/13 at 10:51 exceeded the quality control limit; these compounds were not target analytes. In addition, the %D for acetone, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone in the CCV 280-158842/2 exceeded the quality control limit; these compounds were not detected in the samples. In addition, the %D for methyl acetate, vinyl acetate, ethyl acetate, tetrahydrofuran, in the CCV 280-158842/3 analyzed on 2/6/13 at 11:14 exceeded the

quality control limit; these compounds were not target compounds except vinyl acetate. Vinyl acetate was not detected in the samples. Consistent with the QAPP Worksheet #28 and referenced laboratory SOP Table B-3 the data should be qualified as follows:

Date	Compound	%D	Associated Samples	Flag
2/6/13 instrument VMS_Z	Acetone	22.4%	JP-M13-GWMW806	J (all detects)
	2-butanone	44.0%	JP-M13-GWMW807	UJ (all non-detects)
	4-methyl-2-pentanone	31.1%	JP-M13-GWMW999	
	2-hexanone	21.7%		
	Vinyl acetate	22.3%		

Blanks

- Methylene chloride was detected in the method blank batch 280-158842 at a concentration between the method detection limit and the reporting limit and less than half the reporting limit. Associated samples included JP-M13-GWMW806, JP-M13-GWMW807, and JP-M13-GWMW999. Methylene chloride was detected in all of the samples at a concentration between the MDL and RL. The remaining analytes were not detected in the method blank. Methylene chloride is a common laboratory contaminant; the laboratory qualified the sample results for these compounds with a "B" flag.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The matrix spike and matrix spike duplicate samples were not analyzed. The data are not affected.

Laboratory Control Samples

- The %R for the laboratory control samples (LCS) were within quality control limits.

Internal Standards

- The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 8270C

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

- Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

- Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).
- In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.
- The average response factors (RRF) for all compounds in system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent differences (%D) were within quality control requirements of less than or equal to 25% for each individual compound.

Continuing Calibration

- The continuing calibration verification samples (CCV) were run every twelve hours consistent with the method, DoD QSM, and U.S. EPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.
- The %D for all compounds were within the quality control requirements of less than or equal to 20% with the following exceptions.
- The %D in the CCV sample 280-159815/3 for benzoic acid exceeded the quality control limit. Associated samples included JP-M13-GWMW806, JP-M13-GWMW807, JP-M13-GWMW999. The samples should be qualified "J" for these analytes for positive results.

Date	Compound	%D	Associated Samples	Flag
2/12/13	benzoic acid	24.9%	JP-M13-GWMW806 JP-M13-GWMW807 JP-M13 GWMW999	J (all detects) UJ (all non-detects)

- The continuing calibration response factors for SPCC were within quality control limits, and the %D for the CCC met the quality control requirements.

Blanks

- The method blanks met quality control requirements.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this sample group. The data are not affected.

Laboratory Control Samples

- The %R for the laboratory control samples (LCS/LCSD) were within quality control limits.

Internal Standards

- The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 6010B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Manganese was detected in the method blank at a concentration between the method detection limit and reporting limit and less than one half the reporting limit. Manganese was detected in the samples at concentrations less than the reporting limit and five times greater than the method blank concentration. The laboratory qualified the sample results with a "B" flag for manganese and the flag should be removed.

Compound	QC Sample	Method Blank Concentration	Associated Samples	Sample Concentration	Flag to be removed
Manganese	Method blank	0.000770 mg/L	JP-M13-GWMW806 Manganese	0.0069 mg/L	Remove B
			JP-M13-GWMW807 Manganese	0.13 mg/L	Remove B
			JP-M13-GWMW999 Manganese	0.0069 mg/L	Remove B

-The initial and continuing calibration blanks met method quality control requirements. Metals that were detected in the blanks were less than one half the reporting limit.

Interelement Check Standard

- The interference check standard (ICS-A and ICS-AB) met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The matrix spike and matrix spike duplicate (MS/MSD) sample percent recoveries (%R) were within quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Quality Control/Method Reporting Limit Check

- The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 7470A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- The initial, method, and continuing calibration blanks met method quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The MS/MSD %R were within quality control requirements.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on both columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements on both columns.

Blanks

- 2-Amino-4,6-dinitrotoluene was detected in the method blank at a concentration between the MDL and RL, and less than one half the RL on the secondary column batch 280-158735. The remaining analytes were not detected in the method blank. 2-Amino-4,6-dinitrotoluene was not detected on the primary column method blank sample or in any of the field samples. Since 2-amino-4,6-dinitrotoluene was not confirmed, the samples are not affected.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this sample group. The data are not affected.

Laboratory Control Samples

- The %R for the LCS were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for retention times, secondary column confirmation, dilutions, and RPD between the primary and secondary columns.

EPA SW846 Method 9056A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method and calibration blank analysis met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The MS/MSD samples were not analyzed. The sample results are not affected.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158842	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z1675.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1920			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1920				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10	UJ	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0	UJ	1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0	UJ	1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	0.50	J B	0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0	UJ	1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158842	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z1675.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1920			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1920				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0	UJ	0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	107		75 - 120
Dibromofluoromethane (Surr)	103		85 - 115
1,2-Dichloroethane-d4 (Surr)	109		70 - 120
Toluene-d8 (Surr)	105		85 - 120

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158842	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z1676.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1943			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1943				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10	UJ	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0	UJ	1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	1.2		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	1.9		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0	UJ	1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	0.52	J B	0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0	UJ	1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158842	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z1676.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 1943			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 1943				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	0.28	J	0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	0.28	J	0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0	UJ	0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	106		75 - 120
Dibromofluoromethane (Surr)	103		85 - 115
1,2-Dichloroethane-d4 (Surr)	109		70 - 120
Toluene-d8 (Surr)	102		85 - 120

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Date Sampled: 01/31/2013 1200

Client Matrix: Water

Date Received: 01/31/2013 1457

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158842	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z1677.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 2006			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 2006				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10	UJ	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0	UJ	1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0		0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0	UJ	1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	0.57	J B	0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0	UJ	1.0	5.0
Methyl tert-butyl ether	<5.0		0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Date Sampled: 01/31/2013 1200

Client Matrix: Water

Date Received: 01/31/2013 1457

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-158842	Instrument ID:	VMS_Z
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Z1677.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	02/06/2013 2006			Final Weight/Volume:	20 mL
Prep Date:	02/06/2013 2006				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.40	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0	UJ	0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	105		75 - 120
Dibromofluoromethane (Surr)	103		85 - 115
1,2-Dichloroethane-d4 (Surr)	110		70 - 120
Toluene-d8 (Surr)	102		85 - 120

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159815	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158933	Lab File ID:	D6473.D
Dilution:	1.0			Initial Weight/Volume:	1055.1 mL
Analysis Date:	02/12/2013 1347			Final Weight/Volume:	1000 uL
Prep Date:	02/06/2013 1130			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.5		0.27	9.5
Acenaphthylene	<9.5		0.46	9.5
Anthracene	<9.5		0.40	9.5
Benzidine	<190		47	190
Benzo[a]anthracene	<9.5		0.33	9.5
Benzo[a]pyrene	<9.5		0.29	9.5
Benzo[b]fluoranthene	<9.5		0.50	9.5
Benzo[g,h,i]perylene	<9.5		0.47	9.5
Benzoic acid	<76	UJ	9.5	76
Benzo[k]fluoranthene	<9.5		0.44	9.5
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.5		0.92	9.5
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	<9.5		0.53	9.5
4-Bromophenyl phenyl ether	<9.5		0.41	9.5
Butyl benzyl phthalate	<19		0.95	19
Carbazole	<9.5		0.41	9.5
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.5		0.25	9.5
2-Chlorophenol	<9.5		1.9	9.5
4-Chlorophenyl phenyl ether	<9.5		1.6	9.5
Chrysene	<9.5		0.51	9.5
Dibenz(a,h)anthracene	<9.5		0.48	9.5
Dibenzofuran	<9.5		0.27	9.5
1,2-Dichlorobenzene	<9.5		0.22	9.5
1,3-Dichlorobenzene	<9.5		0.28	9.5
1,4-Dichlorobenzene	<9.5		0.30	9.5
3,3'-Dichlorobenzidine	<47		1.9	47
2,4-Dichlorophenol	<9.5		0.61	9.5
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.5		0.55	9.5
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.5	76
2,4-Dinitrotoluene	<19		1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.5		0.22	9.5
Fluoranthene	<19		0.19	19
Fluorene	<9.5		0.29	9.5
Hexachlorobenzene	<9.5		0.63	9.5
Hexachlorobutadiene	<28		3.1	28
Hexachloroethane	<9.5		2.0	9.5
Indeno[1,2,3-cd]pyrene	<9.5		0.62	9.5

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159815	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158933	Lab File ID:	D6473.D
Dilution:	1.0			Initial Weight/Volume:	1055.1 mL
Analysis Date:	02/12/2013 1347			Final Weight/Volume:	1000 uL
Prep Date:	02/06/2013 1130			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.5		0.20	9.5
2-Methylnaphthalene	<9.5		0.27	9.5
2-Methylphenol	<9.5		0.93	9.5
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.5		0.27	9.5
2-Nitroaniline	<47		1.6	47
3-Nitroaniline	<47		1.9	47
4-Nitroaniline	<47		1.9	47
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<47		1.2	47
N-Nitrosodimethylamine	<9.5		0.27	9.5
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.5		0.42	9.5
2,2'-oxybis[1-chloropropane]	<9.5		0.27	9.5
Pentachlorophenol	<76		19	76
Phenanthrene	<9.5		0.25	9.5
Phenol	<9.5		1.9	9.5
Pyrene	<9.5		0.35	9.5
1,2,4-Trichlorobenzene	<9.5		0.27	9.5
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.27	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	69		50 - 110
2-Fluorophenol (Surr)	69		20 - 110
Nitrobenzene-d5 (Surr)	70		40 - 110
Phenol-d5 (Surr)	73		10 - 115
Terphenyl-d14 (Surr)	100		50 - 135
2,4,6-Tribromophenol (Surr)	86		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159815	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158933	Lab File ID:	D6474.D
Dilution:	1.0			Initial Weight/Volume:	1058 mL
Analysis Date:	02/12/2013 1407			Final Weight/Volume:	1000 uL
Prep Date:	02/06/2013 1130			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.5		0.26	9.5
Acenaphthylene	<9.5		0.46	9.5
Anthracene	<9.5		0.40	9.5
Benzidine	<190		47	190
Benzo[a]anthracene	<9.5		0.33	9.5
Benzo[a]pyrene	<9.5		0.29	9.5
Benzo[b]fluoranthene	<9.5		0.50	9.5
Benzo[g,h,i]perylene	<9.5		0.47	9.5
Benzoic acid	<76	UJ	9.5	76
Benzo[k]fluoranthene	<9.5		0.43	9.5
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.5		0.92	9.5
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	<9.5		0.53	9.5
4-Bromophenyl phenyl ether	<9.5		0.41	9.5
Butyl benzyl phthalate	<19		0.95	19
Carbazole	<9.5		0.41	9.5
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.5		0.25	9.5
2-Chlorophenol	<9.5		1.9	9.5
4-Chlorophenyl phenyl ether	<9.5		1.6	9.5
Chrysene	<9.5		0.51	9.5
Dibenz(a,h)anthracene	<9.5		0.48	9.5
Dibenzofuran	<9.5		0.27	9.5
1,2-Dichlorobenzene	<9.5		0.22	9.5
1,3-Dichlorobenzene	<9.5		0.28	9.5
1,4-Dichlorobenzene	<9.5		0.30	9.5
3,3'-Dichlorobenzidine	<47		1.9	47
2,4-Dichlorophenol	<9.5		0.60	9.5
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.5		0.55	9.5
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.5	76
2,4-Dinitrotoluene	<19		1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.5		0.22	9.5
Fluoranthene	<19		0.19	19
Fluorene	<9.5		0.29	9.5
Hexachlorobenzene	<9.5		0.62	9.5
Hexachlorobutadiene	<28		3.1	28
Hexachloroethane	<9.5		2.0	9.5
Indeno[1,2,3-cd]pyrene	<9.5		0.61	9.5

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159815	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158933	Lab File ID:	D6474.D
Dilution:	1.0			Initial Weight/Volume:	1058 mL
Analysis Date:	02/12/2013 1407			Final Weight/Volume:	1000 uL
Prep Date:	02/06/2013 1130			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.5		0.20	9.5
2-Methylnaphthalene	<9.5		0.27	9.5
2-Methylphenol	<9.5		0.93	9.5
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.5		0.27	9.5
2-Nitroaniline	<47		1.6	47
3-Nitroaniline	<47		1.9	47
4-Nitroaniline	<47		1.9	47
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<47		1.2	47
N-Nitrosodimethylamine	<9.5		0.27	9.5
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.5		0.42	9.5
2,2'-oxybis[1-chloropropane]	<9.5		0.26	9.5
Pentachlorophenol	<76		19	76
Phenanthrene	<9.5		0.25	9.5
Phenol	<9.5		1.9	9.5
Pyrene	<9.5		0.35	9.5
1,2,4-Trichlorobenzene	<9.5		0.26	9.5
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.27	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	67		50 - 110
2-Fluorophenol (Surr)	67		20 - 110
Nitrobenzene-d5 (Surr)	69		40 - 110
Phenol-d5 (Surr)	70		10 - 115
Terphenyl-d14 (Surr)	97		50 - 135
2,4,6-Tribromophenol (Surr)	83		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Date Sampled: 01/31/2013 1200

Client Matrix: Water

Date Received: 01/31/2013 1457

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159815	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158933	Lab File ID:	D6475.D
Dilution:	1.0			Initial Weight/Volume:	1055.5 mL
Analysis Date:	02/12/2013 1428			Final Weight/Volume:	1000 uL
Prep Date:	02/06/2013 1130			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	<9.5		0.27	9.5
Acenaphthylene	<9.5		0.46	9.5
Anthracene	<9.5		0.40	9.5
Benidine	<190		47	190
Benzo[a]anthracene	<9.5		0.33	9.5
Benzo[a]pyrene	<9.5		0.29	9.5
Benzo[b]fluoranthene	<9.5		0.50	9.5
Benzo[g,h,i]perylene	<9.5		0.47	9.5
Benzoic acid	<76	UJ	9.5	76
Benzo[k]fluoranthene	<9.5		0.44	9.5
Benzyl alcohol	<24		0.22	24
Bis(2-chloroethoxy)methane	<9.5		0.92	9.5
Bis(2-chloroethyl)ether	<19		0.39	19
Bis(2-ethylhexyl) phthalate	<9.5		0.53	9.5
4-Bromophenyl phenyl ether	<9.5		0.41	9.5
Butyl benzyl phthalate	<19		0.95	19
Carbazole	<9.5		0.41	9.5
4-Chloroaniline	<24		2.0	24
4-Chloro-3-methylphenol	<19		2.3	19
2-Chloronaphthalene	<9.5		0.25	9.5
2-Chlorophenol	<9.5		1.9	9.5
4-Chlorophenyl phenyl ether	<9.5		1.6	9.5
Chrysene	<9.5		0.51	9.5
Dibenz(a,h)anthracene	<9.5		0.48	9.5
Dibenzofuran	<9.5		0.27	9.5
1,2-Dichlorobenzene	<9.5		0.22	9.5
1,3-Dichlorobenzene	<9.5		0.28	9.5
1,4-Dichlorobenzene	<9.5		0.30	9.5
3,3'-Dichlorobenzidine	<47		1.9	47
2,4-Dichlorophenol	<9.5		0.61	9.5
Diethyl phthalate	<19		0.36	19
2,4-Dimethylphenol	<9.5		0.55	9.5
Dimethyl phthalate	<19		0.20	19
Di-n-butyl phthalate	<19		1.1	19
4,6-Dinitro-2-methylphenol	<76		3.8	76
2,4-Dinitrophenol	<76		9.5	76
2,4-Dinitrotoluene	<19		1.6	19
2,6-Dinitrotoluene	<19		1.8	19
Di-n-octyl phthalate	<19		0.33	19
1,2-Diphenylhydrazine	<9.5		0.22	9.5
Fluoranthene	<19		0.19	19
Fluorene	<9.5		0.29	9.5
Hexachlorobenzene	<9.5		0.63	9.5
Hexachlorobutadiene	<28		3.1	28
Hexachloroethane	<9.5		2.0	9.5
Indeno[1,2,3-cd]pyrene	<9.5		0.62	9.5

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Date Sampled: 01/31/2013 1200

Client Matrix: Water

Date Received: 01/31/2013 1457

8270C/DoD Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270C/DoD	Analysis Batch:	280-159815	Instrument ID:	SMS_D
Prep Method:	3520C	Prep Batch:	280-158933	Lab File ID:	D6475.D
Dilution:	1.0			Initial Weight/Volume:	1055.5 mL
Analysis Date:	02/12/2013 1428			Final Weight/Volume:	1000 uL
Prep Date:	02/06/2013 1130			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Isophorone	<9.5		0.20	9.5
2-Methylnaphthalene	<9.5		0.27	9.5
2-Methylphenol	<9.5		0.93	9.5
3 & 4 Methylphenol	<19		0.24	19
Naphthalene	<9.5		0.27	9.5
2-Nitroaniline	<47		1.6	47
3-Nitroaniline	<47		1.9	47
4-Nitroaniline	<47		1.9	47
Nitrobenzene	<19		0.77	19
2-Nitrophenol	<19		0.37	19
4-Nitrophenol	<47		1.2	47
N-Nitrosodimethylamine	<9.5		0.27	9.5
N-Nitrosodi-n-propylamine	<19		0.33	19
N-Nitrosodiphenylamine	<9.5		0.42	9.5
2,2'-oxybis[1-chloropropane]	<9.5		0.27	9.5
Pentachlorophenol	<76		19	76
Phenanthrene	<9.5		0.25	9.5
Phenol	<9.5		1.9	9.5
Pyrene	<9.5		0.35	9.5
1,2,4-Trichlorobenzene	<9.5		0.27	9.5
2,4,5-Trichlorophenol	<19		0.43	19
2,4,6-Trichlorophenol	<19		0.27	19

Surrogate	%Rec	Qualifier	Acceptance Limits
2-Fluorobiphenyl	68		50 - 110
2-Fluorophenol (Surr)	66		20 - 110
Nitrobenzene-d5 (Surr)	68		40 - 110
Phenol-d5 (Surr)	70		10 - 115
Terphenyl-d14 (Surr)	100		50 - 135
2,4,6-Tribromophenol (Surr)	88		40 - 125

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158925	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158735	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/06/2013 1526			Injection Volume:	100 µL
Prep Date:	02/05/2013 1100			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.089	0.40
2,4-Dinitrotoluene	<0.40		0.084	0.40
2,6-Dinitrotoluene	<0.20		0.065	0.20
HMX	<0.40		0.088	0.40
m-Nitrotoluene	<0.40		0.083	0.40
Nitrobenzene	<0.40		0.091	0.40
o-Nitrotoluene	<0.40		0.086	0.40
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.052	0.20
Tetryl	<0.24		0.079	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.40		0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	90		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158925	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158735	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/06/2013 1552			Injection Volume:	100 µL
Prep Date:	02/05/2013 1100			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.089	0.40
2,4-Dinitrotoluene	<0.40		0.084	0.40
2,6-Dinitrotoluene	<0.20		0.065	0.20
HMX	<0.40		0.088	0.40
m-Nitrotoluene	<0.40		0.083	0.40
o-Nitrotoluene	<0.40		0.086	0.40
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.052	0.20
Tetryl	<0.24		0.079	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.40		0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	86		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-159172	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-158735	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/07/2013 1636			Injection Volume:	100 µL
Prep Date:	02/05/2013 1100			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	<0.40		0.091	0.40

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-159172	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-158735	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/07/2013 1636			Injection Volume:	100 µL
Prep Date:	02/05/2013 1100			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	93		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Date Sampled: 01/31/2013 1200

Client Matrix: Water

Date Received: 01/31/2013 1457

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-158925	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-158735	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	02/06/2013 1618			Injection Volume:	100 µL
Prep Date:	02/05/2013 1100			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.089	0.40
2,4-Dinitrotoluene	<0.40		0.084	0.40
2,6-Dinitrotoluene	<0.20		0.065	0.20
HMX	<0.40		0.088	0.40
m-Nitrotoluene	<0.40		0.083	0.40
Nitrobenzene	<0.40		0.091	0.40
o-Nitrotoluene	<0.40		0.086	0.40
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.052	0.20
Tetryl	<0.24		0.079	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.40		0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	89		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-160980	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-160351	Lab File ID:	26a021813.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/18/2013 1240			Final Weight/Volume:	50 mL
Prep Date:	02/15/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Iron	0.15		0.022	0.10

Analysis Method:	6010B	Analysis Batch:	280-160954	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-160351	Lab File ID:	25A2021813.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/18/2013 1425			Final Weight/Volume:	50 mL
Prep Date:	02/15/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Antimony	<0.020		0.0031	0.020
Arsenic	<0.025		0.0044	0.025
Barium	0.095		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	0.00073	J	0.00045	0.0050
Calcium	76		0.035	1.0
Chromium	<0.015		0.00066	0.015
Cobalt	<0.015		0.0012	0.015
Copper	<0.015	^	0.0014	0.015
Lead	<0.015		0.0026	0.015
Magnesium	45		0.011	0.50
Manganese	0.0069	J ^ B	0.00025	0.010
Nickel	<0.040		0.0013	0.040
Potassium	1.9	J	0.24	3.0
Selenium	<0.022		0.0049	0.022
Silver	<0.015		0.00093	0.015
Sodium	26		0.092	5.0
Thallium	<0.040		0.0049	0.040
Vanadium	<0.015	^	0.0011	0.015
Zinc	<0.15		0.0045	0.15

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-159426	Instrument ID:	MT_033
Prep Method:	7470A	Prep Batch:	280-159134	Lab File ID:	130207aa.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	02/07/2013 1620			Final Weight/Volume:	30 mL
Prep Date:	02/07/2013 1140				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-160980	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-160351	Lab File ID:	26a021813.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/18/2013 1252			Final Weight/Volume:	50 mL
Prep Date:	02/15/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Iron	0.41		0.022	0.10

Analysis Method:	6010B	Analysis Batch:	280-160954	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-160351	Lab File ID:	25A2021813.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/18/2013 1436			Final Weight/Volume:	50 mL
Prep Date:	02/15/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Antimony	<0.020		0.0031	0.020
Arsenic	<0.025		0.0044	0.025
Barium	0.093		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	0.00092	J	0.00045	0.0050
Calcium	180		0.035	1.0
Chromium	<0.015		0.00066	0.015
Cobalt	<0.015		0.0012	0.015
Copper	<0.015	^	0.0014	0.015
Lead	<0.015		0.0026	0.015
Magnesium	85		0.011	0.50
Manganese	0.13	^ B	0.00025	0.010
Nickel	0.0031	J	0.0013	0.040
Potassium	8.0		0.24	3.0
Selenium	<0.022		0.0049	0.022
Silver	<0.015		0.00093	0.015
Sodium	420		0.092	5.0
Thallium	<0.040		0.0049	0.040
Vanadium	0.0012	J ^	0.0011	0.015
Zinc	<0.15		0.0045	0.15

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-159426	Instrument ID:	MT_033
Prep Method:	7470A	Prep Batch:	280-159134	Lab File ID:	130207aa.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	02/07/2013 1629			Final Weight/Volume:	30 mL
Prep Date:	02/07/2013 1140				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Client Matrix: Water

Date Sampled: 01/31/2013 1200

Date Received: 01/31/2013 1457

6010B Metals (ICP)-Dissolved

Analysis Method:	6010B	Analysis Batch:	280-160980	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-160351	Lab File ID:	26a021813.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/18/2013 1254			Final Weight/Volume:	50 mL
Prep Date:	02/15/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Iron	0.16		0.022	0.10

Analysis Method:	6010B	Analysis Batch:	280-160954	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-160351	Lab File ID:	25A2021813.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	02/18/2013 1438			Final Weight/Volume:	50 mL
Prep Date:	02/15/2013 0800				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Aluminum	<0.30		0.018	0.30
Antimony	0.0039	J	0.0031	0.020
Arsenic	<0.025		0.0044	0.025
Barium	0.098		0.00058	0.010
Beryllium	<0.0015		0.00047	0.0015
Cadmium	0.00073	J	0.00045	0.0050
Calcium	78		0.035	1.0
Chromium	<0.015		0.00066	0.015
Cobalt	<0.015		0.0012	0.015
Copper	<0.015	^	0.0014	0.015
Lead	<0.015		0.0026	0.015
Magnesium	46		0.011	0.50
Manganese	0.0069	J ^ B	0.00025	0.010
Nickel	<0.040		0.0013	0.040
Potassium	2.1	J	0.24	3.0
Selenium	<0.022		0.0049	0.022
Silver	<0.015		0.00093	0.015
Sodium	27		0.092	5.0
Thallium	<0.040		0.0049	0.040
Vanadium	<0.015	^	0.0011	0.015
Zinc	<0.15		0.0045	0.15

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-159426	Instrument ID:	MT_033
Prep Method:	7470A	Prep Batch:	280-159134	Lab File ID:	130207aa.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	02/07/2013 1631			Final Weight/Volume:	30 mL
Prep Date:	02/07/2013 1140				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Mercury	<0.20		0.027	0.20

JR 7/19/2013

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

General Chemistry**Client Sample ID:** JP-M13-GWMW806

Lab Sample ID: 500-54239-1

Date Sampled: 01/31/2013 1023

Client Matrix: Water

Date Received: 01/31/2013 1457

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.26	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-158828	Analysis Date: 02/01/2013 1630					
Sulfate	78		mg/L	1.2	25	5.0	9056A
	Analysis Batch: 280-158707	Analysis Date: 02/04/2013 2011					

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

General Chemistry**Client Sample ID:** JP-M13-GWMW807

Lab Sample ID: 500-54239-2

Date Sampled: 01/31/2013 0933

Client Matrix: Water

Date Received: 01/31/2013 1457

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	<1.0		mg/L	0.084	1.0	2.0	9056A
	Analysis Batch: 280-158828	Analysis Date: 02/01/2013 1647					
Sulfate	260		mg/L	4.6	100	20	9056A
	Analysis Batch: 280-158707	Analysis Date: 02/04/2013 2028					

Analytical Data

Client: Toltest Inc.

Job Number: 500-54239-1

General Chemistry**Client Sample ID:** JP-M13-GWMW999

Lab Sample ID: 500-54239-3

Date Sampled: 01/31/2013 1200

Client Matrix: Water

Date Received: 01/31/2013 1457

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.42	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-158828	Analysis Date: 02/01/2013 1704					
Sulfate	79		mg/L	1.2	25	5.0	9056A
	Analysis Batch: 280-158707	Analysis Date: 02/04/2013 2045					



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June 3, 2013

Project No. 22271

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on April 9, 2013 and received by the laboratory on April 9, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-55877.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, volatile organic compounds (VOC) using SW846 Method 8260B, semi-volatile organic compounds (SVOC) using SW846 8270C, metals using SW846 Method 6010B, mercury using SW846 Method 7470A, and sulfate/nitrates using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-M13-GWMW126R	4/09/2013	10:50	500-55877-1	1	water	4/30/13
JP-M13-GWMW362	4/09/2013	9:45	500-55877-2	1	water	4/30/13
JP-M13-GWMW806	4/09/2013	10:33	500-55877-3	1	water	4/30/13
JP-M13-GWMW807	4/09/2013	11:22	500-55877-4	1	water	4/30/13
JP-M13-GWMW808	4/09/2013	12:34	500-55877-5	1	water	4/30/13
JP-M13-GWMW809	4/09/2013	12:20	500-55877-6	1	water	4/30/13
JP-M13-GWMW999	4/09/2013	9:00	500-55877-7	1	water	4/30/13

Sample Analysis

1. explosives, VOC, SVOC, metals, sulfate/nitrate
2. sulfate
3. VOC

OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010)* (QAPP), the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, DoD Quality Systems Manual Version 4 Draft, (January 2009), *Louisville Chemistry Guideline, (LCG)* (June 2002), and



U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, daily tune requirements, internal standards, surrogates, laboratory control samples (LCS), method blanks, trip blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.

SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8260B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

- Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

- Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).
- In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990 which meets quality control requirements.
- The average response factors (RRF) for all compounds in system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent differences (%D) were within quality control requirements of less than or equal to 25% for each individual compound with the following exceptions.
- The %D for methyl tert-butyl ether, cyclohexanone in the ICV 280-168119/15 exceeded the quality control limit. Cyclohexanone is not a target analyte. Consistent with the QAPP Worksheet #28 and referenced laboratory SOP Table B-3 the data should be qualified as follows:

Date	Compound	%D	Associated Samples	Flag
4/11/13	Methyl tert-butyl ether	48.0%	All samples	R

Continuing Calibration

- The continuing calibration verification samples (CCV) were run every twelve hours consistent with the method, DoD QSM, and U.S. EPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.

- The %D for all compounds were within the quality control requirements of less than or equal to 20%. The %D for the CCC and the continuing calibration response factors for SPCC were with quality control limits with the following exception.
- The %D for 2-chloroethyl vinyl ether in the CCV 280-168902/3 analyzed on 4/10/13 at 18:41 exceeded the quality control limit. The %D in the CCV 280-168902/5 analyzed on 4/10/13 at 19:26 exceeded the quality control limit for dichlorodifluoromethane, acrolein; acrolein and 2-chloroethyl vinyl ether were not target analytes.
- The %D for dichlorodifluoromethane, acrolein, 2-methyl-2-propanol, 1-chlorohexane, isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene in the CCV 280-169085/2 analyzed on 4/11/13 at 20:10 exceeded the quality control limit. The %D for 2-chloroethyl vinyl ether in the CCV 280-169085/3 analyzed on 4/11/13 at 20:33 exceeded the quality control limit. Acrolein, 2-methyl-2-propanol, 1-chlorohexane, and 2-chloroethyl vinyl ether were not target analytes. Consistent with the QAPP Worksheet #28 and referenced laboratory SOP Table B-3 the data should be qualified as follows:

Date	Compound	%D	Associated Samples	Flag
CCV 280-168902/5 4/10/13	Dichlorodifluoromethane	38.5%	JP-M13-GWMW126R JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW809 JP-M13-GWMW808	Q
CCV 280-169085/2 4/11/13	Dichlorodifluoromethane	38.1%	JP-M13-GWMW362 JP-M13-GWMW999	Q
CCV 280-169085/2 4/11/13	Isopropylbenzene n-propylbenzene 1,3,5- trimethylbenzene n-butylbenzene	24.5% 21.0% 22.0% 23.8%	JP-M13-GWMW362 JP-M13-GWMW999	J (all detects) UJ (all non-detects)

Blanks

- Methylene chloride was detected in the method blank 280-168902/8 at a concentration between the method detection limit and the reporting limit and less than half the reporting limit. Associated samples included JP-M13-GWMW126R, JP-M13-GWMW806, JP-M13-GWMW807, JP-M13-GWMW809, JP-M13-GWMW808. Methylene chloride was not detected in the samples. The remaining analytes were not detected in the method blank. Acetone and methylene chloride are common laboratory contaminants, the samples are not affected. The methylene chloride was detected in the method blank 280-169085/7 at a concentration between the method detection limit and the reporting limit and less than half the reporting limit. Associated samples included JP-M13-GWMW999 and JP-M13-GWMW362.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The matrix spike and matrix spike duplicate samples (MS/MSD) %R and relative percent differences (%RPD) were within quality control limits with the following exception.

- The %R for 4-isopropyltoluene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were below the lower quality control limit in the MS sample. The %Rs for these analytes were within quality control limits in the MSD sample, therefore the parent sample was not qualified for these analytes.

Laboratory Control Samples

- The %R for the laboratory control samples (LCS) were within quality control limits with the following exception.
- The %R for acetone exceeded the upper quality control limit in the LCS associated with samples JP-M13-GWMW126R, JP-M13-GWMW806, JP-M13-GWMW807, JP-M13-GWMW808, and JP-M13-GWMW809. The samples should be qualified with a “Q” flag for acetone.

QC Sample	Compound	%D	Associated Samples	Flag
LCS 280-168902/7	Acetone	162.0%	JP-M13-GWMW126R, JP-M13-GWMW806, JP-M13-GWMW807, JP-M13-GWMW808, JP-M13-GWMW809	Q

Internal Standards

- The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 8270C

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

- Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

- Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).
- In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.
- The average response factors (RRF) for all compounds in system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent differences (%D) were within quality control requirements of less than or equal to 25% for each individual compound.

Continuing Calibration

- The continuing calibration verification samples (CCV) were run every twelve hours consistent with the method, DoD QSM, and U.S. EPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.
- The %D for all compounds were within the quality control requirements of less than or equal to 20%.
- The continuing calibration response factors for SPCC were within quality control limits, and the %D for the CCC met the quality control requirements.

Blanks

- The method blanks met quality control requirements.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The matrix spike and matrix spike duplicate samples (MS/MSD) %R and relative percent differences (%RPD) were within quality control limits.

Laboratory Control Samples

- The %R for the laboratory control samples (LCS/LCSD) were within quality control limits.

Internal Standards

- The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 6010B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- The initial and continuing calibration blanks, and method blank met method quality control requirements. Metals that were detected in the blanks were less than one half the reporting limit.

Interelement Check Standard

- The interference check standard (ICS-A and ICS-AB) met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The matrix spike and matrix spike duplicate (MS/MSD) sample percent recoveries (%R) were within quality control requirements. The %RPD was within the quality control limits.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Quality Control/Method Reporting Limit Check

- The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 7470A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- The initial, method, and continuing calibration blanks met method quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The MS/MSD %R were within quality control requirements.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements. The re-analysis of samples JP-M13-GWMW126R and JP-M13GWMW808 was outside holding times. The samples were reanalyzed due to poor surrogate recoveries on both the primary and secondary columns.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on all columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements on all columns with the following exceptions.
- The %D for 2,4-diamino-6-nitrotoluene (32.2%) on instrument CHHPLC-G2-LUNA (secondary column) exceeded the quality control limit of 20%. This compound is not a target analyte therefore the data are not affected.

Blanks

- The method blanks met quality control requirements.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements with the following exceptions: the surrogate %R was below the lower quality control limit on the primary column in sample JP-M13-GWMW126R, JP-M13-GWMW362, JP-M13-GWMW807, and JP-M13-GWMW808. Matrix interferences were noted in the case narrative which contributed to the poor surrogate recoveries. The surrogate %R was below the lower quality control limit on the secondary column in sample JP-M13-GWMW126R. In each case where the surrogate %R did not meet the quality control limit on one column, the %R was within the quality control limits on the other column, with the exception of JP-M13-GWMW126R. Samples JP-M13-GWMW126R and JP-M13-GWMW808 were re-analyzed and the surrogate %R was within quality control limits for each sample. The samples were reanalyzed outside hold time. Sample results for JP-M13-GWMW-362, JP-M13-GWMW126R, JP-M13-GWMW807, and JP-M13-GWMW808 should be qualified with "J" flag since the poor surrogate recovery was on the primary column.

Date	Compound	%R	Associated Samples	Flag
4/12/13	Surrogate 1,2-Dinitrobenzene	74%	JP-M13-GWMW362	J for detects and UJ for non- detects
		63%	JP-M13-GWMW126R	
		66%	JP-M13-GWMW807	
		64%	JP-M13-GWMW808	

Matrix Spikes/Matrix Spike Duplicates

- The matrix spike and matrix spike duplicate samples (MS/MSD) %R and %RPD were within quality control limits with the following exception.
- The %R for p-nitrotoluene in the MSD sample exceeded the upper quality control limit, and the %RPD exceeded the quality control limit. The %R was within the quality control limits in the MS sample, therefore the data were not qualified.

Laboratory Control Samples

- The %R for the LCS were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for retention times, secondary column confirmation, dilutions, and RPD between the primary and secondary columns with the following exception.
- The RPD between the primary and secondary columns exceeded the quality control limit for 2,6-dinitrotoluene, 4-amino-2,6-DNT, 2-amino-4,6-DNT in sample JP-M13-GWMW-362, and 4-amino-2,6-DNT, and 2,6-dinitrotoluene in sample JP-M13-GWMW999. These analytes should be qualified with a "J" in these samples.

Date	Compound	%RPD	Associated Samples	Flag
4/12/2013	2,6-dinitrotoluene	46.2%	JP-M13-GWMW362	J
	4-amino-2,6-DNT	52.0%		
	2-amino-4,6-DNT	40.8%		
4/12/2013	4-amino-2,6-DNT	55.8%	JP-M13-GWMW999	J
	2,6-dinitrotoluene	45.3%		

EPA SW846 Method 9056A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method blank analysis met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The MS/MSD sample %R was within quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-55877-1

Date Sampled: 04/09/2013 1050

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3802.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0211			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0211				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<1.0	* Q	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

RS
6-13-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-55877-1

Date Sampled: 04/09/2013 1050

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3802.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0211			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0211				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	102		75 - 120
Dibromofluoromethane (Surr)	110		85 - 115
1,2-Dichloroethane-d4 (Surr)	108		70 - 120
Toluene-d8 (Surr)	108		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-55877-2

Date Sampled: 04/09/2013 0945

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-169085	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3833.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 2232			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 2232				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10		1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	0.40	J	0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0	UJ	0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0	UJ	0.32	1.0
N-Propylbenzene	<1.0	UJ	0.16	1.0
o-Xylene	<1.0		0.19	1.0

RS 6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-55877-2

Date Sampled: 04/09/2013 0945

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-169085	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3833.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 2232			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 2232				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	0.26	J	0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	98		75 - 120
Dibromofluoromethane (Surr)	101		85 - 115
1,2-Dichloroethane-d4 (Surr)	92		70 - 120
Toluene-d8 (Surr)	111		85 - 120

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-55877-3

Date Sampled: 04/09/2013 1033

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3806.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0340			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0340				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10	* Q	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-55877-3

Date Sampled: 04/09/2013 1033

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3806.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0340			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0340				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	104		75 - 120
Dibromofluoromethane (Surr)	108		85 - 115
1,2-Dichloroethane-d4 (Surr)	105		70 - 120
Toluene-d8 (Surr)	107		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-55877-4

Date Sampled: 04/09/2013 1122

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3807.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0402			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0402				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<1.0	* Q	1.9	1.0
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	1.1		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	1.5		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-55877-4

Date Sampled: 04/09/2013 1122

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3807.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0402			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0402				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	0.22	J	0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	0.22	J	0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	99		75 - 120
Dibromofluoromethane (Surr)	98		85 - 115
1,2-Dichloroethane-d4 (Surr)	98		70 - 120
Toluene-d8 (Surr)	104		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-55877-5

Date Sampled: 04/09/2013 1234

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3808.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0424			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0424				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<1.0	*Q	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	0.91	J	0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

RS 6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-55877-5

Date Sampled: 04/09/2013 1234

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3808.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0424			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0424				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	102		75 - 120
Dibromofluoromethane (Surr)	106		85 - 115
1,2-Dichloroethane-d4 (Surr)	102		70 - 120
Toluene-d8 (Surr)	105		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-55877-6

Date Sampled: 04/09/2013 1220

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3809.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0446			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0446				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<10	* Q	1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	<1.0		0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0		0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0		0.32	1.0
N-Propylbenzene	<1.0		0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-55877-6

Date Sampled: 04/09/2013 1220

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-168902	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3809.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 0446			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 0446				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	<1.0		0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0

Surrogate	%Rec	Qualifier	Acceptance Limits
4-Bromofluorobenzene (Surr)	94		75 - 120
Dibromofluoromethane (Surr)	100		85 - 115
1,2-Dichloroethane-d4 (Surr)	99		70 - 120
Toluene-d8 (Surr)	102		85 - 120

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-55877-7

Date Sampled: 04/09/2013 0900

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-169085	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3834.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 2254			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 2254				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	<1.0		1.9	10
Benzene	<1.0		0.16	1.0
Bromobenzene	<1.0		0.17	1.0
Bromoform	<1.0		0.19	1.0
Bromomethane	<2.0		0.21	2.0
2-Butanone (MEK)	<6.0		1.8	6.0
Carbon disulfide	<2.0		0.45	2.0
Carbon tetrachloride	<2.0		0.19	2.0
Chlorobenzene	<1.0		0.17	1.0
Bromochloromethane	<1.0		0.10	1.0
Dibromochloromethane	<1.0		0.17	1.0
Chloroethane	<2.0		0.41	2.0
Chloroform	<1.0		0.16	1.0
Chloromethane	<2.0		0.30	2.0
2-Chlorotoluene	<1.0		0.17	1.0
4-Chlorotoluene	<1.0		0.17	1.0
cis-1,2-Dichloroethene	<1.0		0.15	1.0
cis-1,3-Dichloropropene	<1.0		0.16	1.0
1,2-Dibromo-3-Chloropropane	<5.0		0.81	5.0
Dibromomethane	<1.0		0.17	1.0
1,2-Dichlorobenzene	<1.0		0.13	1.0
1,3-Dichlorobenzene	<1.0		0.16	1.0
1,4-Dichlorobenzene	<1.0		0.16	1.0
Bromodichloromethane	<1.0		0.17	1.0
Dichlorodifluoromethane	<2.0	Q	0.31	2.0
1,1-Dichloroethane	0.39	J	0.16	1.0
1,2-Dichloroethane	<1.0		0.13	1.0
1,1-Dichloroethene	<1.0		0.14	1.0
1,2-Dichloropropane	<1.0		0.13	1.0
1,3-Dichloropropane	<1.0		0.15	1.0
2,2-Dichloropropane	<1.0		0.20	1.0
1,1-Dichloropropene	<1.0		0.15	1.0
Ethylbenzene	<1.0		0.16	1.0
1,2-Dibromoethane	<1.0		0.18	1.0
Hexachlorobutadiene	<1.0		0.36	1.0
2-Hexanone	<5.0		1.4	5.0
Isopropylbenzene	<1.0	UJ	0.19	1.0
4-Isopropyltoluene	<1.0		0.17	1.0
Methylene Chloride	<5.0		0.32	5.0
4-Methyl-2-pentanone (MIBK)	<5.0		1.0	5.0
Methyl tert-butyl ether	<5.0	R	0.25	5.0
m&p-Xylene	<2.0		0.34	2.0
Naphthalene	<1.0		0.22	1.0
n-Butylbenzene	<1.0	UJ	0.32	1.0
N-Propylbenzene	<1.0	UJ	0.16	1.0
o-Xylene	<1.0		0.19	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-55877-7

Date Sampled: 04/09/2013 0900

Client Matrix: Water

Date Received: 04/09/2013 1507

8260B/DoD Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B/DoD	Analysis Batch:	280-169085	Instrument ID:	VMS_G
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G3834.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	04/11/2013 2254			Final Weight/Volume:	20 mL
Prep Date:	04/11/2013 2254				

Analyte	Result (ug/L)	Qualifier	MDL	RL
sec-Butylbenzene	<1.0		0.17	1.0
Styrene	<1.0		0.17	1.0
tert-Butylbenzene	<1.0		0.16	1.0
1,1,1,2-Tetrachloroethane	<1.0		0.17	1.0
1,1,2,2-Tetrachloroethane	<1.0		0.20	1.0
Tetrachloroethene	0.23	J	0.20	1.0
Toluene	<1.0		0.17	1.0
trans-1,2-Dichloroethene	<1.0		0.15	1.0
trans-1,3-Dichloropropene	<1.0		0.19	1.0
1,2,3-Trichlorobenzene	<1.0		0.18	1.0
1,2,4-Trichlorobenzene	<1.0		0.32	1.0
1,1,1-Trichloroethane	<1.0		0.16	1.0
1,1,2-Trichloroethane	<1.0		0.32	1.0
Trichloroethene	<1.0		0.16	1.0
Trichlorofluoromethane	<2.0		0.29	2.0
1,2,3-Trichloropropane	<3.0		0.77	3.0
1,2,4-Trimethylbenzene	<1.0		0.14	1.0
1,3,5-Trimethylbenzene	<1.0		0.14	1.0
Vinyl chloride	<1.5		0.10	1.5
Xylenes, Total	<1.0		0.19	1.0
Vinyl acetate	<3.0		0.94	3.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene (Surr)	86		75 - 120	
Dibromofluoromethane (Surr)	102		85 - 115	
1,2-Dichloroethane-d4 (Surr)	94		70 - 120	
Toluene-d8 (Surr)	97		85 - 120	

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-55877-1

Date Sampled: 04/09/2013 1050

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	493.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 1651			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	UJ	0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	<0.41		0.085	0.41
2,6-Dinitrotoluene	<0.20		0.065	0.20
HMX	<0.41		0.089	0.41
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.092	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.080	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.41	X	0.073	0.41

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	63	X	75 - 118

QB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-55877-1

Date Sampled: 04/09/2013 1050

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	493.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0520			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	58	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-55877-1

Date Sampled: 04/09/2013 1050

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171029	Initial Weight/Volume:	480.20 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 1257	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/24/2013 1017			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.21	H	0.053	0.21
4-Amino-2,6-dinitrotoluene	<0.21	H	0.060	0.21
1,3-Dinitrobenzene	<0.42	H	0.092	0.42
2,4-Dinitrotoluene	<0.42	H	0.087	0.42
2,6-Dinitrotoluene	<0.21	H	0.067	0.21
HMX	<0.42	H	0.091	0.42
m-Nitrotoluene	<0.42	H	0.087	0.42
Nitrobenzene	<0.42	H	0.095	0.42
o-Nitrotoluene	<0.42	H	0.089	0.42
p-Nitrotoluene	<1.0	H	0.21	1.0
RDX	<0.21	H	0.054	0.21
Tetryl	<0.25	H	0.083	0.25
1,3,5-Trinitrobenzene	<1.0	H	0.21	1.0
2,4,6-Trinitrotoluene	<0.42	H	0.075	0.42

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	92		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-55877-2

Date Sampled: 04/09/2013 0945

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	499.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 1810			Injection Volume:	100 µL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.82	p J	0.051	0.20
4-Amino-2,6-dinitrotoluene	0.61	p J	0.058	0.20
1,3-Dinitrobenzene	<0.40	U J	0.089	0.40
2,4-Dinitrotoluene	3.9	U	0.084	0.40
2,6-Dinitrotoluene	0.26	p J	0.065	0.20
HMX	<0.40	U J	0.088	0.40
m-Nitrotoluene	<0.40	U J	0.083	0.40
Nitrobenzene	<0.40	U J	0.091	0.40
o-Nitrotoluene	<0.40	U J	0.086	0.40
p-Nitrotoluene	<1.0	U J	0.20	1.0
RDX	<0.20	U J	0.052	0.20
1,3,5-Trinitrobenzene	2.5	U J	0.20	1.0
2,4,6-Trinitrotoluene	<0.40	U J	0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	74	X	75 - 118

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-55877-2

Date Sampled: 04/09/2013 0945

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	499.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0638			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Tetryl	<0.24		0.079	0.24

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-55877-2

Date Sampled: 04/09/2013 0945

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	499.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0638			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-55877-3

Date Sampled: 04/09/2013 1033

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	449.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 1836			Injection Volume:	100 µL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.22		0.056	0.22
4-Amino-2,6-dinitrotoluene	<0.22		0.064	0.22
1,3-Dinitrobenzene	<0.45		0.099	0.45
2,4-Dinitrotoluene	<0.45		0.093	0.45
2,6-Dinitrotoluene	<0.22		0.072	0.22
HMX	<0.45		0.097	0.45
m-Nitrotoluene	<0.45		0.093	0.45
Nitrobenzene	<0.45		0.10	0.45
o-Nitrotoluene	<0.45		0.095	0.45
p-Nitrotoluene	<1.1		0.22	1.1
RDX	<0.22		0.058	0.22
Tetryl	<0.27		0.088	0.27
1,3,5-Trinitrobenzene	<1.1		0.22	1.1
2,4,6-Trinitrotoluene	<0.45		0.081	0.45

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	82		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-55877-4

Date Sampled: 04/09/2013 1122

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	491.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 1902			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	UJ	0.052	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	<0.41		0.085	0.41
2,6-Dinitrotoluene	<0.20		0.066	0.20
HMX	<0.41		0.089	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.081	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.41	X	0.074	0.41
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	66	X	75 - 118	

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-55877-4

Date Sampled: 04/09/2013 1122

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	491.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0717			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.093	0.41

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-55877-4

Date Sampled: 04/09/2013 1122

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	491.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0717			Injection Volume:	100 µL
Prep Date:	04/10/2013 1726			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	94		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-55877-5

Date Sampled: 04/09/2013 1234

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	491 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 1929			Injection Volume:	100 µL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	U	0.052	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	<0.41		0.085	0.41
2,6-Dinitrotoluene	<0.20		0.066	0.20
HMX	<0.41		0.089	0.41
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.093	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.081	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.41	X	0.074	0.41

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	64	X	75 - 118

PS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-55877-5

Date Sampled: 04/09/2013 1234

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171029	Initial Weight/Volume:	486.30 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 1324	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/24/2013 1017			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.21	H	0.052	0.21
4-Amino-2,6-dinitrotoluene	<0.21	H	0.059	0.21
1,3-Dinitrobenzene	<0.41	H	0.091	0.41
2,4-Dinitrotoluene	<0.41	H	0.086	0.41
2,6-Dinitrotoluene	<0.21	H	0.066	0.21
HMX	<0.41	H	0.090	0.41
m-Nitrotoluene	<0.41	H	0.086	0.41
Nitrobenzene	<0.41	H	0.094	0.41
o-Nitrotoluene	<0.41	H	0.088	0.41
p-Nitrotoluene	<1.0	H	0.21	1.0
RDX	<0.21	H	0.054	0.21
Tetryl	<0.25	H	0.082	0.25
1,3,5-Trinitrobenzene	<1.0	H	0.21	1.0
2,4,6-Trinitrotoluene	<0.41	H	0.074	0.41

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-55877-6

Date Sampled: 04/09/2013 1220

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	469 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 2021			Injection Volume:	100 µL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.21		0.054	0.21
4-Amino-2,6-dinitrotoluene	<0.21		0.062	0.21
1,3-Dinitrobenzene	<0.43		0.095	0.43
2,4-Dinitrotoluene	<0.43		0.089	0.43
2,6-Dinitrotoluene	<0.21		0.069	0.21
HMX	<0.43		0.093	0.43
m-Nitrotoluene	<0.43		0.089	0.43
o-Nitrotoluene	<0.43		0.091	0.43
p-Nitrotoluene	<1.1		0.21	1.1
RDX	<0.21		0.056	0.21
Tetryl	<0.26		0.085	0.26
1,3,5-Trinitrobenzene	<1.1		0.21	1.1
2,4,6-Trinitrotoluene	<0.43		0.077	0.43

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-55877-6

Date Sampled: 04/09/2013 1220

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	469 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0756			Injection Volume:	100 µL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	<0.43		0.097	0.43

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-55877-6

Date Sampled: 04/09/2013 1220

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	469 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0756			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	114		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-55877-7

Date Sampled: 04/09/2013 0900

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169031	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	491.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/12/2013 2048			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.78	J	0.052	0.20
4-Amino-2,6-dinitrotoluene	0.60	p	0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	3.6		0.085	0.41
2,6-Dinitrotoluene	0.25	p J	0.066	0.20
HMX	<0.41		0.089	0.41
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.093	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.081	0.24
1,3,5-Trinitrobenzene	2.4		0.20	1.0
2,4,6-Trinitrotoluene	<0.41		0.074	0.41
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	83		75 - 118	

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-55877-7

Date Sampled: 04/09/2013 0900

Client Matrix: Water

Date Received: 04/09/2013 1507

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169334	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-168880	Initial Weight/Volume:	491.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/14/2013 0835			Injection Volume:	100 uL
Prep Date:	04/10/2013 1726			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID: JP-M13-GWMW126R**

Lab Sample ID: 500-55877-1

Date Sampled: 04/09/2013 1050

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.089	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1230					
Sulfate	56		mg/L	1.2	25	5.0	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 2023					

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID:** JP-M13-GWMW362

Lab Sample ID: 500-55877-2

Date Sampled: 04/09/2013 0945

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	<0.50		mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1332					
Sulfate	260		mg/L	2.3	50	10	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 2125					

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID:** JP-M13-GWMW806

Lab Sample ID: 500-55877-3

Date Sampled: 04/09/2013 1033

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.23	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1347					
Sulfate	80		mg/L	1.2	25	5.0	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 2140					

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID:** JP-M13-GWMW807

Lab Sample ID: 500-55877-4

Date Sampled: 04/09/2013 1122

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	<1.0		mg/L	0.084	1.0	2.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1403					
Sulfate	230		mg/L	2.3	50	10	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 2156					

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID:** JP-M13-GWMW808

Lab Sample ID: 500-55877-5

Date Sampled: 04/09/2013 1234

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	3.8		mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1418					
Sulfate	490		mg/L	4.6	100	20	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 2242					

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID:** JP-M13-GWMW809

Lab Sample ID: 500-55877-6

Date Sampled: 04/09/2013 1220

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	0.091	J	mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1433					
Sulfate	8.5		mg/L	0.23	5.0	1.0	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 1433					

Analytical Data

Client: Toltest Inc.

Job Number: 500-55877-1

General Chemistry**Client Sample ID:** JP-M13-GWMW999

Lab Sample ID: 500-55877-7

Date Sampled: 04/09/2013 0900

Client Matrix: Water

Date Received: 04/09/2013 1507

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Nitrate as N	<0.50		mg/L	0.042	0.50	1.0	9056A
	Analysis Batch: 280-169053	Analysis Date: 04/10/2013 1449					
Sulfate	260		mg/L	2.3	50	10	9056A
	Analysis Batch: 280-169052	Analysis Date: 04/10/2013 2257					



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May 2, 2013

Project No. 22271

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on April 10, 2013 and received by the laboratory on April 11, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-55945.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, and sulfate using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-M9- GWMW330	4/10/13	0920	500-55945-1	2	water	4/24/2013
JP-M6- GWMW117	4/10/13	1130	500-55945-2	1	water	4/24/2013
JP-OA- GWMW118	4/10/13	1408	500-55945-3	1	water	4/24/2013
JP-OA- GWMW119	4/10/13	1410	500-55945-4	1	water	4/24/2013
JP-M6- GWMW123R	4/10/13	1600	500-55945-5	1	water	4/24/2013
JP-M7- GWMW-124R	4/10/13	1621	500-55945-6	1	water	4/24/2013
JP-M6- GWMW162R	4/10/13	1640	500-55945-7	1	water	4/24/2013
JP-M6- GWMW318	4/10/13	1701	500-55945-8	1	water	4/24/2013
JP-M6- GWMW652	4/10/13	1725	500-55945-9	1	water	4/24/2013
JP-M6- GWMW319	4/10/13	1741	500-55945-10	1	water	4/24/2013

Sample Analysis

1. explosives,
2. sulfate



OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010)* (QAPP), the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, DoD Quality Systems Manual Version 4 Draft, (January 2009), *Louisville Chemistry Guideline*, (LCG) (June 2002), and U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, daily tune requirements, internal standards, surrogates, laboratory control samples (LCS), method blanks, trip blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.

SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on both columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements for all target analytes on both columns. The %D for 2,4-diamino-6-nitrotoluene exceeded the quality control requirement on column CHHPLC-G2_LUNA; this analyte is not a target analyte.

Blanks

- 4-Amino-2,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL, and greater than one half the RL on the secondary column batch 280-169673. The remaining analytes were not detected in the method blank. Since 4-amino-2,6-dinitrotoluene was not confirmed on the primary column, the samples are not affected. 2-Amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL and greater than one half the RL on the secondary column in batch 280-170328. Since 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene were not confirmed on the primary column, the samples are not affected.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements with the following exceptions.

- Sample JP-M6-GWMW318 required dilution. The surrogate recoveries were above the quality control limit on the primary and secondary column. The diluted analysis, the surrogate was diluted out and the surrogate recovery was below the lower quality control limit on the primary column. The surrogate recovery on the secondary column in the diluted analysis exceeded the upper quality control limit. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.
- Sample JP-M6-GWMW652 required dilution. The surrogate recovery on the primary column was below the lower quality control limit and exceeded the upper quality control limit on the secondary column in the undiluted sample analysis. The diluted analysis the surrogates were diluted out. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.
- The surrogate percent recovery in sample JP-M6-GWMW319 exceeded the upper quality control limit on the secondary column. The surrogate percent recovery was within the quality control limits on the primary column. This sample also required dilution for HMX and the surrogate recoveries exceeded the upper quality control limit in the diluted analysis on both columns. The sample result for HMX should be flagged “J” since the surrogate recovery was within the quality control limits for the undiluted analysis for the other target analytes, but exceeded the percent recovery in the diluted analysis for HMX.
- The surrogate percent recoveries in sample JP-M7-GWMW124R were below the lower quality control limit on the primary and secondary column. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.

Date	Compound	%R	Associated Samples	Flag
4/15/2013	Surrogate 1,2-Dinitrobenzene Primary column	37%	JP-M7-GWMW124R	J for detects and UJ for non- detects
4/16/2013	Surrogate 1,2-Dinitrobenzene Primary column	173%	JP-M6-GWMW319	HMX J
4/15/2013	Surrogate 1,2-Dinitrobenzene Primary column	23%	JP-M6-GWMW652	J for detects and UJ for non- detects
4/18/2013	Surrogate 1,2-Dinitrobenzene Primary column	339%	JP-M6-GWMW318	J for detects and UJ for non- detects

- The surrogate retention time shifted in the samples from the surrogate relative retention time on the primary column for most of the samples. In addition, there was a retention time shift for the method blank, LCS, LCSD and end of run CCV on the secondary column. The case narrative discussed the retention time shift and noted the samples were evaluated based on the shift. The retention times for the detected analytes were within the relative retention time windows of the respective analytes of the continuing calibration standard on each column, and therefore have not been qualified.

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this sample group. The data are not affected.

Laboratory Control Samples

- The %R for the LCS samples were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for secondary column confirmation and dilutions.
- The RPD between the primary and secondary columns exceeded the quality control limit of less than or equal to 40% in samples JP-M6-GWMW318 undiluted for 1,3,5-trinitrobenzene, and 2,6-dinitrotoluene; sample JP-M6-GWMW318 diluted for HMX; sample JP-M6-GWMW652 for RDX, 1,3-dinitrobenzene, nitrobenzene, 4-amino-2,6-dinitrotoluene, and p-nitrotoluene; sample JP-M6-GWMW319 for HMX. These analytes should be qualified with a "J" in these samples.

Date	Compound	%RPD	Associated Samples	Flag
4/18/2013	1,3,5-trinitrobenzene, 2,6-dinitrotoluene	78.7% 156.7%	JP-M6-GWMW318 undiluted	J
4/19/2013	HMX	128%	JP-M6-GWMW318 diluted	J
4/15/2013	RDX, 1,3-dinitrobenzene, nitrobenzene, 4-amino-2,6-dinitrotoluene, and p-nitrotoluene	197.7% 54% 55.3% 51.9% 43.2%	JP-M6-GWMW652	J
4/16/2013	HMX	56.9%	JP-M6-GWMW319	J

- The retention time shifted for HMX on the primary column in sample JP-M6-GWMW318 diluted analysis. The case narrative noted the retention time shift on the primary column for all of the samples due to adjusting the pH of the eluent during the priming sequence. The case narrative noted the shift was taken into account when reviewing samples for target analytes.

EPA SW846 Method 9056A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method and calibration blank analysis met quality control requirements. Sulfate was detected in the calibration blank 280-169750 at a concentration between the MDL and RL and less than half the RL. This calibration blank was analyzed before the project sample and the succeeding calibration blanks were non-detect for target analytes, therefore the sample was not qualified. In addition, the sample result was greater than 10x the blank concentration.

Matrix Spike/Matrix Spike Duplicate Analysis

- The MS/MSD samples were not analyzed with the project samples. The sample results are not affected.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M7-GWMW124R

Lab Sample ID: 500-55945-6

Date Sampled: 04/10/2013 1621

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169453	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	491.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/15/2013 1943			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	JJ	0.052	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.059	0.20
1,3-Dinitrobenzene	<0.41		0.090	0.41
2,4-Dinitrotoluene	<0.41		0.085	0.41
2,6-Dinitrotoluene	<0.20		0.066	0.20
m-Nitrotoluene	<0.41		0.085	0.41
Nitrobenzene	<0.41		0.093	0.41
o-Nitrotoluene	<0.41		0.087	0.41
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.081	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.41		0.074	0.41
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	37	X	75 - 118	

BS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M7-GWMW124R

Lab Sample ID: 500-55945-6

Date Sampled: 04/10/2013 1621

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	491.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2019			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	<0.41		0.089	0.41

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M7-GWMW124R

Lab Sample ID: 500-55945-6

Date Sampled: 04/10/2013 1621

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	491.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2019			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	58	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW318

Lab Sample ID: 500-55945-8

Date Sampled: 04/10/2013 1701

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	533.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 1926			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.19	UJ	0.047	0.19
1,3-Dinitrobenzene	<0.37	UJ	0.083	0.37
2,4-Dinitrotoluene	<0.37	UJ	0.079	0.37
m-Nitrotoluene	<0.37	UJ	0.078	0.37
Nitrobenzene	<0.37	UJ	0.085	0.37
o-Nitrotoluene	<0.37	UJ	0.080	0.37
p-Nitrotoluene	<0.94	UJ	0.19	0.94
2,4,6-Trinitrotoluene	<0.37	UJ	0.068	0.37
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	339	X	75 - 118	

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW318

Lab Sample ID: 500-55945-8

Date Sampled: 04/10/2013 1701

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	533.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2059			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	<0.19		0.054	0.19
2,6-Dinitrotoluene	0.79	-P J	0.060	0.19
RDX	<0.19		0.049	0.19
Tetryl	<0.22		0.074	0.22
1,3,5-Trinitrobenzene	2.4	-P J	0.19	0.94

CB 6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW318

Lab Sample ID: 500-55945-8

Date Sampled: 04/10/2013 1701

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	533.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2059			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	241	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW318

Lab Sample ID: 500-55945-8

Date Sampled: 04/10/2013 1701

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	533.7 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 1327	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW318

Lab Sample ID: 500-55945-8

Date Sampled: 04/10/2013 1701

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	533.7 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2138	Run Type:	DL	Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	16	P J	0.41	1.9

23
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW318

Lab Sample ID: 500-55945-8

Date Sampled: 04/10/2013 1701

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	533.7 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2138	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	204	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GMMW652

Lab Sample ID: 500-55945-9

Date Sampled: 04/10/2013 1725

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169453	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	490.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/15/2013 2154			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	33	JS	0.052	0.20
4-Amino-2,6-dinitrotoluene	71	JS	0.059	0.20
1,3-Dinitrobenzene	1.8	J	0.090	0.41
HMX	<0.41	JS	0.089	0.41
Tetryl	<0.24	JS	0.081	0.24
1,3,5-Trinitrobenzene	3.0	J	0.20	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	23	X	75 - 118	

JS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW652

Lab Sample ID: 500-55945-9

Date Sampled: 04/10/2013 1725

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	490.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2137			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	4.3	PJ	0.093	0.41
RDX	0.48	PJ	0.053	0.20

PS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW652

Lab Sample ID: 500-55945-9

Date Sampled: 04/10/2013 1725

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	490.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2137			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	151	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW652

Lab Sample ID: 500-55945-9

Date Sampled: 04/10/2013 1725

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169667	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	490.8 mL
Dilution:	1000			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 1644			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2,4-Dinitrotoluene	1700		85	410
2,6-Dinitrotoluene	480		66	200
m-Nitrotoluene	760		85	410
o-Nitrotoluene	7800		87	410
p-Nitrotoluene	5100	J	200	1000
2,4,6-Trinitrotoluene	270	J	74	410

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW652

Lab Sample ID: 500-55945-9

Date Sampled: 04/10/2013 1725

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169667	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	490.8 mL
Dilution:	1000			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 1644			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW652

Lab Sample ID: 500-55945-9

Date Sampled: 04/10/2013 1725

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	490.8 mL
Dilution:	1000			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2216			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW319

Lab Sample ID: 500-55945-10

Date Sampled: 04/10/2013 1741

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169667	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	494.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 1711			Injection Volume:	100 µL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	6.2		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.090	0.40
2,4-Dinitrotoluene	<0.40		0.085	0.40
2,6-Dinitrotoluene	<0.20		0.065	0.20
2,4,6-Trinitrotoluene	<0.40		0.073	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	108		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW319

Lab Sample ID: 500-55945-10

Date Sampled: 04/10/2013 1741

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	494.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2334			Injection Volume:	100 µL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
m-Nitrotoluene	<0.40		0.084	0.40
Nitrobenzene	<0.40		0.092	0.40
o-Nitrotoluene	<0.40		0.086	0.40
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.080	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW319

Lab Sample ID: 500-55945-10

Date Sampled: 04/10/2013 1741

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	494.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 2334			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	166	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW319

Lab Sample ID: 500-55945-10

Date Sampled: 04/10/2013 1741

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169667	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	494.7 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	04/16/2013 1737			Injection Volume:	100 µL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	173	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW319

Lab Sample ID: 500-55945-10

Date Sampled: 04/10/2013 1741

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	494.7 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	04/17/2013 0013			Injection Volume:	100 µL
Prep Date:	04/14/2013 1027			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	57	p j	0.89	4.0

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-55945-1

Client Sample ID: JP-M6-GWMW319

Lab Sample ID: 500-55945-10

Date Sampled: 04/10/2013 1741

Client Matrix: Water

Date Received: 04/11/2013 1010

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169673	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169371	Initial Weight/Volume:	494.7 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	04/17/2013 0013			Injection Volume:	100 uL
Prep Date:	04/14/2013 1027			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	198	X	75 - 118



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June 5, 2013

Project No. 22271

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on April 11, 2013 and received by the laboratory on April 12, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-56026.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, and sulfate using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-M9- GWMW998	4/11/13	09:15	500-56026-1	1	water	4/25/2013
JP-M6- GWMW212R	4/11/13	10:20	500-56026-2	1	water	4/25/2013
JP-M6- GWMW313	4/11/13	10:03	500-56026-3	1	water	4/25/2013
JP-M6- GWMW654	4/11/13	09:30	500-56026-4	1	water	4/25/2013
JP-M1- GWMW649	4/11/13	11:45	500-56026-5	2	water	4/25/2013
JP-M1- GWMW-107	4/11/13	11:15	500-56026-6	2	water	4/25/2013
JP-M1-SW709	4/11/13	11:40	500-56026-7	2	water	4/25/2013
JP-M1- GWMW643	4/11/13	16:00	500-56026-8	2	water	4/25/2013
JP-M1- GWMW644	4/11/13	16:28	500-56026-9	2	water	4/25/2013
JP-M1- GWMW648	4/11/13	17:15	500-56026-10	2	water	4/25/2013
JP-M1- GWMW645	4/11/13	17:48	500-56026-11	2	water	4/25/2013
JP-M1- GWMW646	4/11/13	16:10	500-56026-12	2	water	4/25/2013
JP-M01- GWMW231	4/12/13	10:46	500-56026-13	2	water	4/25/2013

Sample Analysis 1. explosives, 2. sulfate



OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010)* (QAPP), the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, DoD Quality Systems Manual Version 4 Draft, (January 2009), *Louisville Chemistry Guideline*, (LCG) (June 2002), and U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, surrogates, laboratory control samples (LCS), method blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.

SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met for the initial and first dilution analysis of the samples, however preparation of samples for re-analysis was outside hold time for samples JP-M6-GWMW998, JP-M6-GWMW313, JP-M6-GWMW654, and JP-M6-GWMW212R. The results from the initial and first dilution should be used. The cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on both columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements for all target analytes on both columns. The %D for 2,4-diamino-6-nitrotoluene exceeded the quality control requirement on column CHHPLC-G2_LUNA; this analyte is not a target analyte.

Blanks

- 2-Amino-4,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL, and less than one half the RL on both columns batch 280-169633. In addition, 4-amino-2,6-dinitrotoluene was detected in the method blank on the secondary column at a concentration between the DL and RL, and less than one half the RL batch 280-169633. The remaining analytes were not detected in the method blank for batch 280-169633. 2-Amino-4,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL and greater than one half the RL on both columns in batch 280-170294. In addition, 4-amino-2,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL and greater than one half the RL on the secondary column in batch 280-170294. The samples were not qualified since analyte concentrations detected in the method blanks were less than the RL.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements with the following exceptions.
- Sample JP-M6-GWMW998 required dilution. The surrogate recoveries were below the quality control limit on the primary and secondary column in the initial analysis. The diluted analysis, the surrogate was diluted out and the surrogate recovery was below the lower quality control limit on both columns. The sample was re-analyzed outside hold time and surrogate recoveries were outside quality control limits. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.
- Sample JP-M6-GWMW212R required dilution. The surrogate recoveries were below the quality control limit on the primary and secondary column in the initial analysis. The diluted analysis, the surrogate was diluted out and the surrogate recovery was below the lower quality control limit on both columns. The sample was re-analyzed outside hold time and surrogate recoveries were outside quality control limits. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.
- The surrogate percent recovery in sample JP-M6-GWMW654 exceeded the upper quality control limit on the primary column. The surrogate percent recovery was within the quality control limits on the secondary column. The sample was reanalyzed but outside hold times. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.

Date	Compound	%R	Associated Samples	Flag
4/17/2013	Surrogate 1,2-Dinitrobenzene Primary column	0%	JP-M6-GWMW998	J for detects and UJ for non- detects
4/17/2013	Surrogate 1,2-Dinitrobenzene Primary column	0%	JP-M6-GWMW212R	J for detects and UJ for non- detects
4/17/2013	Surrogate 1,2-Dinitrobenzene Primary column	148%	JP-M6-GWMW654	J for detects and UJ for non- detects

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this project sample group. The data are not affected.

Laboratory Control Samples

- The %R for the LCS samples were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for secondary column confirmation and dilutions. The case narrative reported matrix interferences were present which interfered with surrogate recoveries.

- The RPD between the primary and secondary columns exceeded the quality control limit of less than or equal to 40% in samples JP-M6-GWMW998 undiluted for RDX, 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, and nitrobenzene; sample JP-M6-GWMW998 diluted for 2-amino-4,6-dinitrotoluene; sample JP-M6-GWMW212R undiluted for RDX, 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, nitrobenzene; sample JP-M6-GWMW212R diluted for 2-amino-4,6-dinitrotoluene; sample JP-M6-GWMW313 for RDX; and sample JP-M6-GWMW654 for RDX, 1,3,5-trinitrobenzene, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, 2,6-dinitrotoluene, 2,4-dinitrotoluene. These analytes should be qualified with a “J” in these samples.

Date	Compound	%RPD	Associated Samples	Flag
4/17/2013	RDX 1,3,5-trinitrobenzene, 1,3-dinitrobenzene nitrobenzene	199.8% 176.5% 163.3% 120.9%	JP-M6-GWMW998 undiluted	J
4/18/2013	2-amino-4,6-dinitrotoluene	62.0%	JP-M6-GWMW998 diluted	J
4/17/2013	RDX, 1,3,5-trinitrobenzene 1,3-dinitrobenzene, nitrobenzene,	199.8% 183.4% 66.4% 100.9%	JP-M6-GWMW212R undiluted	J
4/18/2013	2-amino-4,6-dinitrotoluene	41.7%	JP-M6-GWMW212R diluted	J
4/17/2013	RDX	189.6%	JP-M6-GWMW313	J
4/17/2013	RDX, 1,3,5-trinitrobenzene, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, 2,6-dinitrotoluene, 2,4-dinitrotoluene	195.0% 76.0% 79.6% 93.7% 51.7% 41.3%	JP-M6-GWMW654	J

EPA SW846 Method 9056A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method and calibration blank analysis met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The MS/MSD %R were within quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169888	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	535.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/17/2013 2204			Injection Volume:	100 µL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	<0.37	UJ	0.082	0.37
Tetryl	<0.22	UJ	0.074	0.22

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	535.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1431			Injection Volume:	100 µL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,3-Dinitrobenzene	1.9	p J	0.083	0.37
Nitrobenzene	2.4	p J	0.085	0.37
RDX	0.17	J, p	0.049	0.19
1,3,5-Trinitrobenzene	2.3	p J	0.19	0.93

BS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method: 8330B

Analysis Batch: 280-170328

Instrument ID: CHHPLC_G2_LUNA

Prep Method: 3535

Prep Batch: 280-169633

Initial Weight/Volume: 535.9 mL

Dilution: 1.0

Final Weight/Volume: 5 mL

Analysis Date: 04/20/2013 1431

Injection Volume: 100 µL

Prep Date: 04/16/2013 1050

Result Type: SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	501.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 1910	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,3-Dinitrobenzene	1.8	H	0.088	0.40
HMX	<0.40	H	0.087	0.40
Nitrobenzene	3.3	H	0.091	0.40
Tetryl	<0.24	H	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170668	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	501.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2017	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	37	H E p B	0.057	0.20
o-Nitrotoluene	<0.40	H	0.085	0.40
RDX	<0.20	H	0.052	0.20
1,3,5-Trinitrobenzene	<1.0	H	0.20	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	105		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	535.9 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 1550	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	30	J-B p	12	47
4-Amino-2,6-dinitrotoluene	49		13	47
2,4-Dinitrotoluene	1400		20	93
2,6-Dinitrotoluene	430		15	47
m-Nitrotoluene	370		19	93
o-Nitrotoluene	500		20	93
p-Nitrotoluene	2400		47	230
2,4,6-Trinitrotoluene	150		17	93

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	535.9 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 1550	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	535.9 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1510	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	501.8 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 1937	Run Type:	REDL	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	34	J H p B	13	50
2,4-Dinitrotoluene	1600	H	21	100
2,6-Dinitrotoluene	480	H	16	50
m-Nitrotoluene	410	H	21	100
p-Nitrotoluene	2700	H	50	250
2,4,6-Trinitrotoluene	140	H	18	100

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW998

Lab Sample ID: 500-56026-1

Date Sampled: 04/11/2013 0915

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170668	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	501.8 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2056	Run Type:	REDL	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169888	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/17/2013 2231			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	<0.38	UJ	0.083	0.38
Tetryl	<0.23	UJ	0.075	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1549			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,3-Dinitrobenzene	10	pj	0.084	0.38
Nitrobenzene	3.4	pj	0.086	0.38
o-Nitrotoluene	<0.38		0.081	0.38
RDX	0.18	Jp	0.049	0.19
1,3,5-Trinitrobenzene	1.6	pj	0.19	0.95

PS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1549			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	498.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2004	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,3-Dinitrobenzene	2.3	H	0.089	0.40
HMX	<0.40	H	0.088	0.40
Tetryl	<0.24	H	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170668	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	498.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2134	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	1.6	H p	0.091	0.40
o-Nitrotoluene	<0.40	H	0.086	0.40
RDX	<0.20	H	0.052	0.20
1,3,5-Trinitrobenzene	<1.0	H	0.20	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	237	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 1617	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	37	JB p	12	47
4-Amino-2,6-dinitrotoluene	56		14	47
2,4-Dinitrotoluene	1500		20	95
2,6-Dinitrotoluene	440		15	47
m-Nitrotoluene	370		20	95
p-Nitrotoluene	2400		47	240
2,4,6-Trinitrotoluene	140		17	95

PB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 1617	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1628	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	498.3 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2031	Run Type:	REDL	Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	40	J H p B	13	50
4-Amino-2,6-dinitrotoluene	58	H	14	50
2,4-Dinitrotoluene	1600	H	21	100
2,6-Dinitrotoluene	490	H	16	50
m-Nitrotoluene	460	H	21	100
p-Nitrotoluene	2800	H	50	250
2,4,6-Trinitrotoluene	140	H	18	100

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW212R

Lab Sample ID: 500-56026-2

Date Sampled: 04/11/2013 1020

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170668	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	498.3 mL
Dilution:	250			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2213	Run Type:	REDL	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW313

Lab Sample ID: 500-56026-3

Date Sampled: 04/11/2013 1003

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169888	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	549.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/17/2013 2258			Injection Volume:	100 µL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.18		0.046	0.18
4-Amino-2,6-dinitrotoluene	<0.18		0.052	0.18
1,3-Dinitrobenzene	<0.36		0.081	0.36
2,6-Dinitrotoluene	<0.18		0.059	0.18
m-Nitrotoluene	<0.36		0.076	0.36
Nitrobenzene	<0.36		0.083	0.36
o-Nitrotoluene	<0.36		0.078	0.36
Tetryl	<0.22		0.072	0.22
1,3,5-Trinitrobenzene	<0.91		0.18	0.91
2,4,6-Trinitrotoluene	<0.36		0.066	0.36

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW313

Lab Sample ID: 500-56026-3

Date Sampled: 04/11/2013 1003

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	549.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1707			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2,4-Dinitrotoluene	<0.36		0.076	0.36
HMX	<0.36		0.080	0.36
p-Nitrotoluene	<0.91		0.18	0.91
RDX	0.061	J.P.	0.048	0.18

RS

6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW313

Lab Sample ID: 500-56026-3

Date Sampled: 04/11/2013 1003

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	549.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1707			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	92		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW313

Lab Sample ID: 500-56026-3

Date Sampled: 04/11/2013 1003

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	499.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2058	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	H	0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20	H	0.058	0.20
1,3-Dinitrobenzene	<0.40	H	0.089	0.40
2,4-Dinitrotoluene	<0.40	H	0.084	0.40
2,6-Dinitrotoluene	<0.20	H	0.065	0.20
m-Nitrotoluene	<0.40	H	0.083	0.40
Nitrobenzene	<0.40	H	0.091	0.40
o-Nitrotoluene	<0.40	H	0.086	0.40
p-Nitrotoluene	<1.0	H	0.20	1.0
RDX	<0.20	H	0.052	0.20
Tetryl	<0.24	H	0.079	0.24
1,3,5-Trinitrobenzene	<1.0	H	0.20	1.0
2,4,6-Trinitrotoluene	<0.40	H	0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	87		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW313

Lab Sample ID: 500-56026-3

Date Sampled: 04/11/2013 1003

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170668	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	499.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2252	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	<0.40	H	0.088	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	99		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW654

Lab Sample ID: 500-56026-4

Date Sampled: 04/11/2013 0930

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-169888	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/17/2013 2325			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	0.82	pr J	0.055	0.19
1,3-Dinitrobenzene	<0.38	UJ	0.084	0.38
2,4-Dinitrotoluene	0.085	J pr	0.079	0.38
2,6-Dinitrotoluene	0.11	J pr	0.061	0.19
m-Nitrotoluene	<0.38	UJ	0.079	0.38
Nitrobenzene	<0.38	UJ	0.086	0.38
o-Nitrotoluene	0.23	J pr	0.081	0.38
p-Nitrotoluene	<0.95	UJ	0.19	0.95
Tetryl	<0.23	UJ	0.075	0.23
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	148	X	75 - 118	

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW654

Lab Sample ID: 500-56026-4

Date Sampled: 04/11/2013 0930

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1746			Injection Volume:	100 uL
Prep Date:	04/16/2013 1050			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.76	Bp J	0.048	0.19
HMX	<0.38		0.083	0.38
RDX	0.15	Jp	0.049	0.19
1,3,5-Trinitrobenzene	0.32	Jp	0.19	0.95
2,4,6-Trinitrotoluene	<0.38		0.068	0.38

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW654

Lab Sample ID: 500-56026-4

Date Sampled: 04/11/2013 0930

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169633	Initial Weight/Volume:	528.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 1746			Injection Volume:	100 µL
Prep Date:	04/16/2013 1050			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98	p	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW654

Lab Sample ID: 500-56026-4

Date Sampled: 04/11/2013 0930

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	493.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2152	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.28	H p B	0.051	0.20
4-Amino-2,6-dinitrotoluene	1.0	H p	0.058	0.20
1,3-Dinitrobenzene	<0.41	H	0.090	0.41
2,4-Dinitrotoluene	<0.41	H	0.085	0.41
2,6-Dinitrotoluene	0.068	J H p	0.065	0.20
m-Nitrotoluene	<0.41	H	0.084	0.41
Nitrobenzene	<0.41	H	0.092	0.41
o-Nitrotoluene	0.28	J H	0.087	0.41
p-Nitrotoluene	<1.0	H	0.20	1.0
RDX	0.069	J H p	0.053	0.20
Tetryl	<0.24	H	0.080	0.24
2,4,6-Trinitrotoluene	<0.41	H	0.073	0.41

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	116		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56026-1

Client Sample ID: JP-M6-GWMW654

Lab Sample ID: 500-56026-4

Date Sampled: 04/11/2013 0930

Client Matrix: Water

Date Received: 04/12/2013 1619

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170668	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170294	Initial Weight/Volume:	493.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 2331	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	<0.41	H	0.089	0.41
1,3,5-Trinitrobenzene	<1.0	H	0.20	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	102		75 - 118



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June 5, 2013

Project No. 22271

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on April 12-14, 2013 and received by the laboratory on April 15, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-56039.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, and sulfate using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-L01-GWMW131	4/13/13	09:30	500-56039-1	1	water	4/29/2013
JP- L01-GWMWES3	4/13/13	13:39	500-56039-2	1	water	4/29/2013
JP- L01-GWMW173	4/13/13	12:10	500-56039-3	1	water	4/29/2013
JP- L01-GWMW999	4/13/13	12:00	500-56039-4	1	water	4/29/2013
JP- L01-SW550	4/14/13	17:00	500-56039-5	1	water	4/29/2013
JP- L01-GWMWES1	4/13/13	11:15	500-56039-6	1	water	4/29/2013
JP- L01-GWMW174	4/13/13	14:30	500-56039-7	1	water	4/29/2013
JP-M1-GWMW641	4/12/13	10:35	500-56039-8	2	water	4/29/2013
JP-M1-GWMW997	4/12/13	10:00	500-56039-9	2	water	4/29/2013

Sample Analysis 1. explosives, 2. sulfate

OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010) (QAPP)*, the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, DoD Quality Systems Manual Version 4 Draft, (January 2009), *Louisville Chemistry Guideline, (LCG) (June 2002)*, and U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler



temperatures, surrogates, laboratory control samples (LCS), method blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.

SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met for the initial and dilution analyses of the samples.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on both columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements for all target analytes on both columns. The %D for 2,4-diamino-6-nitrotoluene exceeded the quality control requirement on instrument CHHPLC-G2_LUNA; this analyte is not a target analyte.

Blanks

- The method blank met quality control requirements. 2-Amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL, and greater than one half the RL on the secondary column batch 280-169826. The samples were not qualified since analyte concentrations detected in the method blanks were less than the RL.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements with the following exceptions.
- Sample JP-L01-GWMW131 required dilution. The surrogate recovery exceeded the quality control limit on the secondary column and was below the quality control limit on the primary column in the initial analysis. The diluted analysis, the surrogate was diluted out and the surrogate recovery was below the lower quality control limit on the secondary column. The diluted analysis surrogate recovery exceeded the quality control limit on the primary column. The positive results should be flagged with a "J" and the non-detect results flagged with a "UJ".
- Sample JP-L01-GWMWES3 the surrogate recovery exceeded the upper quality control limit on the primary column but was within the quality control limits on the secondary column. The positive results should be

flagged with a “J” and the non-detect results flagged with a “UJ” since the exceedance was on the primary column.

- Sample JP-L01-GWMWES1 required dilution. The surrogate percent recovery exceeded the upper quality control limit on both columns in the initial analysis. The diluted analysis, the surrogate was diluted out and the surrogate recovery was below the lower quality control limit on the secondary column. The diluted analysis surrogate recovery exceeded the quality control limit on the primary column. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.

Date	Compound	%R	Associated Samples	Flag
4/18/2013	Surrogate 1,2-Dinitrobenzene Primary column	0%	JP-L01-GWMW131	J for detects and UJ for non- detects
4/19/2013	Surrogate 1,2-Dinitrobenzene Primary column	144%	JP-L01-GWMWES3	J for detects and UJ for non- detects
4/18/2013	Surrogate 1,2-Dinitrobenzene Primary column	8031%	JP-L01-GWMWES1	J for detects and UJ for non- detects

Matrix Spikes/Matrix Spike Duplicates

- Sample matrix spikes were not analyzed with this project sample group. The data are not affected.

Laboratory Control Samples

- The %R for the LCS samples were within quality control limits.

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for secondary column confirmation and dilutions. The case narrative reported matrix interferences were present which interfered with surrogate recoveries.
- The RPD between the primary and secondary columns exceeded the quality control limit of less than or equal to 40% in samples JP-L01-GWMW173, JP-L01-GWMW999 undiluted for HMX, RDX, 4-amino-2,6-dinitrotoluene; sample JP-L01-GWMWES1 undiluted for 2,6-dinitrobenzene, nitrobenzene. These analytes should be qualified with a “J” in these samples.

Date	Compound	%RPD	Associated Samples	Flag
4/18/2013	HMX RDX 4-amino-2,6-dinitrotoluene	195.2% 80.0% 66.6%	JP-L01-GWMW173 undiluted	J
4/18/2013	HMX RDX 4-amino-2,6-dinitrotoluene	195.4% 76.1% 67.0%	JP-L01-GWMW999 undiluted	J

4/18/2013	2,6-dinitrobenzene, nitrobenzene	188.8% 196.8%	JP-L01-GWMWES1 undiluted	J
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EPA SW846 Method 9056A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method and calibration blank analysis met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- Sample matrix spikes were not analyzed with this project sample group. The data are not affected.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 1953			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,3-Dinitrobenzene	<0.37	VJ	0.082	0.37
2,4-Dinitrotoluene	<0.37		0.077	0.37
2,6-Dinitrotoluene	<0.18		0.059	0.18
m-Nitrotoluene	<0.37		0.077	0.37
o-Nitrotoluene	<0.37		0.079	0.37
p-Nitrotoluene	<0.92		0.18	0.92
Tetryl	<0.22	X	0.073	0.22

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	p X	75 - 118

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2217			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	<0.37		0.081	0.37
Nitrobenzene	<0.37		0.084	0.37
RDX	<0.18		0.048	0.18

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2217			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	2689	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 1354	Run Type:	DL	Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	40		9.3	37
1,3,5-Trinitrobenzene	3100		37	180
2,4,6-Trinitrotoluene	4200		13	74

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 1354	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	11550	D X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2256	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	55	B	11	37

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW131

Lab Sample ID: 500-56039-1

Date Sampled: 04/13/2013 0930

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	543.5 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2256	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES3

Lab Sample ID: 500-56039-2

Date Sampled: 04/13/2013 1339

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	547.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 1421			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.29	J	0.046	0.18
4-Amino-2,6-dinitrotoluene	0.30	p J	0.053	0.18
1,3-Dinitrobenzene	<0.37	J	0.081	0.37
2,4-Dinitrotoluene	<0.37	J	0.077	0.37
2,6-Dinitrotoluene	<0.18	J	0.059	0.18
HMX	<0.37	J	0.080	0.37
m-Nitrotoluene	<0.37	J	0.076	0.37
o-Nitrotoluene	<0.37	J	0.078	0.37
p-Nitrotoluene	<0.91	J	0.18	0.91
RDX	0.11	J, p	0.048	0.18
Tetryl	<0.22	J	0.072	0.22
1,3,5-Trinitrobenzene	<0.91	J	0.18	0.91
2,4,6-Trinitrotoluene	0.23	J	0.066	0.37
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	144	X	75 - 118	

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES3

Lab Sample ID: 500-56039-2

Date Sampled: 04/13/2013 1339

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	547.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2334			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	<0.37		0.083	0.37

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES3

Lab Sample ID: 500-56039-2

Date Sampled: 04/13/2013 1339

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	547.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 2334			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	90		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW173

Lab Sample ID: 500-56039-3

Date Sampled: 04/13/2013 1210

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	545.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 2047			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	1.3		0.046	0.18
4-Amino-2,6-dinitrotoluene	1.0	P J	0.053	0.18
1,3-Dinitrobenzene	<0.37		0.081	0.37
2,4-Dinitrotoluene	<0.37		0.077	0.37
2,6-Dinitrotoluene	<0.18		0.059	0.18
m-Nitrotoluene	<0.37		0.076	0.37
o-Nitrotoluene	<0.37		0.078	0.37
p-Nitrotoluene	<0.92		0.18	0.92
Tetryl	<0.22		0.073	0.22
1,3,5-Trinitrobenzene	<0.92		0.18	0.92
2,4,6-Trinitrotoluene	0.56		0.066	0.37

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	87		75 - 118

BS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW173

Lab Sample ID: 500-56039-3

Date Sampled: 04/13/2013 1210

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	545.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0013			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.22	J p	0.080	0.37
Nitrobenzene	<0.37		0.083	0.37
RDX	1.6	p J	0.048	0.18

RB

6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW173

Lab Sample ID: 500-56039-3

Date Sampled: 04/13/2013 1210

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	545.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0013			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW999

Lab Sample ID: 500-56039-4

Date Sampled: 04/13/2013 1200

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	531.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 2114			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	1.5		0.048	0.19
4-Amino-2,6-dinitrotoluene	1.2	PJ	0.054	0.19
1,3-Dinitrobenzene	<0.38		0.083	0.38
2,4-Dinitrotoluene	<0.38		0.079	0.38
2,6-Dinitrotoluene	<0.19		0.061	0.19
m-Nitrotoluene	<0.38		0.078	0.38
o-Nitrotoluene	<0.38		0.080	0.38
p-Nitrotoluene	<0.94		0.19	0.94
Tetryl	<0.23		0.075	0.23
1,3,5-Trinitrobenzene	<0.94		0.19	0.94
2,4,6-Trinitrotoluene	0.53		0.068	0.38

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		75 - 118

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW999

Lab Sample ID: 500-56039-4

Date Sampled: 04/13/2013 1200

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	531.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0052			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.25	J.P.	0.082	0.38
Nitrobenzene	<0.38		0.086	0.38
RDX	1.7	J.P.	0.049	0.19

RS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW999

Lab Sample ID: 500-56039-4

Date Sampled: 04/13/2013 1200

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	531.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0052			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-SW550

Lab Sample ID: 500-56039-5

Date Sampled: 04/14/2013 1700

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	475.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 2141			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.21		0.053	0.21
4-Amino-2,6-dinitrotoluene	<0.21		0.061	0.21
1,3-Dinitrobenzene	<0.42		0.093	0.42
2,4-Dinitrotoluene	<0.42		0.088	0.42
2,6-Dinitrotoluene	<0.21		0.068	0.21
HMX	<0.42		0.092	0.42
m-Nitrotoluene	<0.42		0.088	0.42
Nitrobenzene	<0.42		0.096	0.42
o-Nitrotoluene	<0.42		0.090	0.42
p-Nitrotoluene	<1.1		0.21	1.1
RDX	<0.21		0.055	0.21
Tetryl	<0.25		0.083	0.25
1,3,5-Trinitrobenzene	<1.1		0.21	1.1
2,4,6-Trinitrotoluene	<0.42		0.076	0.42

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	82		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES1

Lab Sample ID: 500-56039-6

Date Sampled: 04/13/2013 1115

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 2208			Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	10	J	0.051	0.20
4-Amino-2,6-dinitrotoluene	12	J	0.058	0.20
1,3-Dinitrobenzene	<0.40	J	0.088	0.40
2,4-Dinitrotoluene	<0.40	J	0.084	0.40
m-Nitrotoluene	<0.40	J	0.083	0.40
o-Nitrotoluene	<0.40	J	0.085	0.40
p-Nitrotoluene	<1.0	J	0.20	1.0
Tetryl	<0.24	J	0.079	0.24
2,4,6-Trinitrotoluene	25	J	0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	8031	X	75 - 118

ES
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES1

Lab Sample ID: 500-56039-6

Date Sampled: 04/13/2013 1115

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0131			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2,6-Dinitrotoluene	0.29	P J	0.064	0.20
HMX	<0.40		0.087	0.40
Nitrobenzene	0.11	J P	0.091	0.40
RDX	<0.20		0.052	0.20

RB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES1

Lab Sample ID: 500-56039-6

Date Sampled: 04/13/2013 1115

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0131			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	1184	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES1

Lab Sample ID: 500-56039-6

Date Sampled: 04/13/2013 1115

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.2 mL
Dilution:	20			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 1448	Run Type:	DL	Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,3,5-Trinitrobenzene	16	J	4.0	20

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES1

Lab Sample ID: 500-56039-6

Date Sampled: 04/13/2013 1115

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.2 mL
Dilution:	20			Final Weight/Volume:	5 mL
Analysis Date:	04/19/2013 1448	Run Type:	DL	Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	3175	D X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMWES1

Lab Sample ID: 500-56039-6

Date Sampled: 04/13/2013 1115

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170328	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.2 mL
Dilution:	20			Final Weight/Volume:	5 mL
Analysis Date:	04/20/2013 0210	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/17/2013 1215			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	X D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56039-1

Client Sample ID: JP-L01-GWMW174

Lab Sample ID: 500-56039-7

Date Sampled: 04/13/2013 1430

Client Matrix: Water

Date Received: 04/15/2013 1140

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170124	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-169826	Initial Weight/Volume:	501.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/18/2013 2302			Injection Volume:	100 µL
Prep Date:	04/17/2013 1215			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.089	0.40
2,4-Dinitrotoluene	<0.40		0.084	0.40
2,6-Dinitrotoluene	<0.20		0.064	0.20
HMX	<0.40		0.087	0.40
m-Nitrotoluene	<0.40		0.083	0.40
Nitrobenzene	<0.40		0.091	0.40
o-Nitrotoluene	<0.40		0.085	0.40
p-Nitrotoluene	<1.0		0.20	1.0
RDX	<0.20		0.052	0.20
Tetryl	<0.24		0.079	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.40		0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	85		75 - 118



Solutions for Your Site Development,
Construction, and Environmental Projects.

June 6, 2013

Project No. 22271

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W91ZLK-05-D-0012

Site-Wide Long Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION:

TolTest has developed this draft Data Quality Evaluation (DQE) Report for the groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP), in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from groundwater monitoring samples collected on April 12-14, 2013 and received by the laboratory on April 16, 2013. The samples were analyzed by Test America Laboratories, Inc., laboratory report number 500-56075.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846) Method 8330, metals using SW846 Method 6010B, mercury using SW8467470A, and sulfate using SW846 Method 9056A. **Table 1** shows a cross reference of the sample information to the laboratory analytical data package.

Table 1, Groundwater Samples

Sample ID:	Date(s) Sampled:	Time Sampled:	Lab Sample No.:	Analysis:	Matrix:	Report Date:
JP-M1-GWMW640	4/15/13	12:05	500-56075-1	2	water	5/2/2013
JP- M1-GWMW642	4/15/13	12:12	500-56075-2	2	water	5/2/2013
JP- L3-GWMW412	4/15/13	16:35	500-56075-3	3	water	5/2/2013
JP- L3-GWMW633	4/15/13	16:48	500-56075-4	3	water	5/2/2013
JP- L3-GWMW996	4/15/13	12:00	500-56075-5	1	water	5/2/2013
JP- L3-GWMW630	4/16/13	10:52	500-56075-6	3	water	5/2/2013
JP- L3-GWMW631	4/16/13	11:51	500-56075-7	3	water	5/2/2013
JP- L3-GWMW996	4/16/13	12:00	500-56075-8	4	water	5/2/2013
JP-L3-GWMW410	4/16/13	12:52	500-56075-9	1	water	5/2/2013
JP-L3-SW558	4/16/13	10:20	500-56075-10	3	water	5/2/2013
JP-L3-SW777	4/16/13	10:50	500-56075-11	3	water	5/2/2013
JP-L3-SW557	4/16/13	11:20	500-56075-12	3	water	5/2/2013
JP-L3-SW004	4/16/13	12:05	500-56075-13	3	water	5/2/2013

Sample Analysis 1. explosives, 2. Sulfate, 3. Explosives, metals, 4. metals



OVERVIEW:

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois (TolTest, Inc. March 2010)* (QAPP), the *Louisville DOD Quality Systems Manual Supplement, version 1 (USACE Louisville District, March 2007)*, DoD Quality Systems Manual Version 4 Draft, (January 2009), *Louisville Chemistry Guideline*, (LCG) (June 2002), and U.S. EPA Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, surrogates, laboratory control samples (LCS), method blanks, matrix spike and duplicate (MS/MSD) analysis, initial and continuing calibration verifications, (ICV, CCV), calibration blanks, and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP, therefore raw data was not evaluated.

SUMMARY

This section summarizes the findings from the data evaluation of the laboratory analytical data packages. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW846 Method 8330

Holding Time/Sample Preservation

- Holding time requirements were met for the initial and dilution analyses of the samples, however preparation of samples for re-analysis was outside hold time for samples JP- L3-GWMW412, JP- L3-GWMW633, JP- L3-GWMW996, JP- L3-GWMW630, JP- L3-GWMW631, JP-L3-GWMW410, and JP-L3-SW558. The results from the initial and first dilution should be used. The cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration percent relative standard deviation (%RSD) was within quality control requirements for both columns.

Continuing Calibration

- Continuing calibration %D was within quality control requirements on both columns.

Second Source Calibration Verification (Initial Calibration Verification)

- The ICV %D was within quality control requirements for all target analytes on both columns. The %D for 2,4-diamino-6-nitrotoluene exceeded the quality control requirement on instrument CHHPLC-G2_LUNA; this analyte is not a target analyte.

Blanks

- The method blank met quality control requirements. 4-amino-2,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL, and greater than one half the RL on the secondary column batch 280-170277. 2-amino-4,6-dinitrotoluene was detected in the method blank at a concentration between the DL and RL, and less than one half the RL on the primary column batch 280-170292. The samples were not qualified since analyte concentrations detected in the method blanks were less than the RL. The method blank 280-171350 associated with the re-analysis of the samples had detected concentrations for 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, and o-nitrotoluene at concentrations between the DL and RL.

Surrogate Spikes

- Surrogate percent recoveries (%R) were within quality control requirements with the following exceptions.
- Sample JP-L3-GWMW412 required dilution. The surrogate recovery exceeded the quality control limit on the primary column in the initial and diluted analysis, and the re-analysis and diluted re-analysis. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ” since the exceedance was on the primary column.
- Sample JP-L3-GWMW633 the surrogate recovery was below the lower quality control limit on the primary column and secondary columns. The sample was re-analyzed outside the extraction hold time. The positive results should be flagged with a “J” and the non-detect results flagged with a “UJ”.

Date	Compound	%R	Associated Samples	Flag
4/25/2013	Surrogate 1,2-Dinitrobenzene Primary column	242%	JP-L3-GWMW412	J for detects and UJ for non- detects
4/25/2013	Surrogate 1,2-Dinitrobenzene Primary column	60%	JP-L3-GWMW633	J for detects and UJ for non- detects

Matrix Spikes/Matrix Spike Duplicates

- Several percent recoveries were outside the quality control limits in the MS and MSD samples. The %RPD was outside quality control limits for 2,6-dinitrotoluene, and tetryl. The parent sample should be qualified with a J flag for the specific analytes that were outside the quality control limits. Re-analysis of the MS/MSD samples showed similar results.

QC Sample	Compound	%R	Associated Samples	Flag
MS/MSD	2-Amino-4,6 dinitrotoluene	41%	JP-L3-GWMW412	J
	4-amino-2,6 dinitrotoluene	42%		
	2,4-DNT	56%		
	2,6-DNT	58%		
	HMX	159%		
	m-nitrotoluene	48%		
	nitrobenzene	35%		
	o-nitrotoluene	30%		
	p-nitrotoluene	33%		
	RDX	777%		
	1,3,5-trinitrobenzene	51%		
MSD	tetryl	35%	JP-L3-GWMW412	J

Laboratory Control Samples

- The %R for HMX, nitrobenzene, o-nitrotoluene, and p-nitrotoluene was below the lower quality control limits in LCS 280-170277/2A. The associated samples should be qualified with a “Q” flag for these analytes. The %Rs for the LCS 280-171350 associated with the re-analysis of the samples were within quality control limits.

The %Rs in LCS 280-170292/2-A were within quality control limits. The %Rs for the LCS 280-171350 associated with the re-analysis were within quality control limits.

Date	Compound	%R	Associated Samples	Flag
4/25/2013	HMX, nitrobenzene, o-nitrotoluene, p-nitrotoluene	79% 44% 41% 44%	JP-L3-GWMW412 JP-L3-GWMW633 JP- L3-GWMW630 JP- L3-GWMW996 JP- L3-GWMW631 JP-L3-GWMW410 JP-L3-SW558 JP-L3-SW777	Q

Quality Control/Method Reporting Limit Check

- The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

Sample Analysis

- Sample analysis met method requirements for secondary column confirmation and dilutions.
- The RPD between the primary and secondary columns exceeded the quality control limit of less than or equal to 40% in samples JP-L3-GWMW412 undiluted for 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene; sample JP-L3-GWMW630 undiluted for 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene; sample JP-L01-GWMWES1 undiluted for 1,3,5-trinitrobenzene, 2,6-dinitrobenzene, nitrobenzene. These analytes should be qualified with a "J" in these samples.

Date	Compound	%RPD	Associated Samples	Flag
4/25/2013	4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	72.4% 48.1%	JP-L3-GWMW412 undiluted	J
4/25/2013	4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene	108.0% 41.1%	JP-L3-GWMW630 undiluted	J

EPA SW846 Method 6010B

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- The initial and continuing calibration blanks, and method blank met method quality control requirements. Metals that were detected in the blanks were less than one half the reporting limit.

Interelement Check Standard

- The interference check standard (ICS-A and ICS-AB) met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- The matrix spike and matrix spike duplicate (MS/MSD) sample percent recoveries (%R) were within quality control requirements. The %RPD was within the quality control limits.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Quality Control/Method Reporting Limit Check

- The QC/MRL was not reported for this method, however the quarterly check may not be required at this time. The data are not affected.

EPA SW846 Method 7470A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- The initial, method, and continuing calibration blanks met method quality control requirements.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

- The MS/MSD %R were within quality control requirements.

EPA SW846 Method 9056A

Holding Time/Sample Preservation

- Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

- Initial calibration met quality control requirements.

Continuing Calibration

- Continuing calibration percent recoveries (%R) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

- The initial calibration verification (ICV) percent recoveries (%R) were within quality control requirements.

Blanks

- Method and calibration blank analysis met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

- Sample matrix spikes were not analyzed with this project sample group. The data are not affected.

Laboratory Control Sample

- The LCS percent recoveries (%R) were within quality control requirements.

Method Reporting Limit Check

- The method reporting limit check was within quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

The QC requirements met the acceptance criteria for each method as specified in the project QAPP and guidance documents listed with the exceptions note above.

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 0852			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.38	J	0.049	0.19
4-Amino-2,6-dinitrotoluene	0.51	p J	0.056	0.19
1,3-Dinitrobenzene	<0.39	J	0.086	0.39
2,4-Dinitrotoluene	<0.39	J, J	0.081	0.39
2,6-Dinitrotoluene	<0.19	J, J	0.063	0.19
HMX	20	* J, Q	0.085	0.39
m-Nitrotoluene	<0.39	J, J	0.081	0.39
Nitrobenzene	<0.39	* J, J, Q	0.088	0.39
o-Nitrotoluene	<0.39	* J, J, Q	0.083	0.39
p-Nitrotoluene	<0.97	* J, J, Q	0.19	0.97
Tetryl	<0.23	J, J	0.077	0.23
1,3,5-Trinitrobenzene	<0.97	J, J	0.19	0.97
2,4,6-Trinitrotoluene	<0.39	J, J	0.070	0.39
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	242	X	75 - 118	

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Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	512.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/26/2013 2139	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.53	H	0.049	0.20
4-Amino-2,6-dinitrotoluene	0.71	H p	0.056	0.20
1,3-Dinitrobenzene	<0.39	H	0.087	0.39
2,4-Dinitrotoluene	<0.39	H	0.082	0.39
2,6-Dinitrotoluene	<0.20	H	0.063	0.20
HMX	20	H	0.085	0.39
m-Nitrotoluene	<0.39	H	0.081	0.39
o-Nitrotoluene	<0.39	H	0.083	0.39
p-Nitrotoluene	<0.98	H	0.20	0.98
Tetryl	<0.23	H	0.077	0.23
1,3,5-Trinitrobenzene	<0.98	H	0.20	0.98
2,4,6-Trinitrotoluene	<0.39	H	0.071	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	242	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0348			Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	111	p	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	512.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0742	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Nitrobenzene	<0.39	H	0.089	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	119	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.8 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/26/2013 1830	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
RDX	74	J	0.25	0.97

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Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.8 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/26/2013 1830	Run Type:	DL	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	221	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	512.5 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/26/2013 2206	Run Type:	REDL	Injection Volume:	100 uL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
RDX	80	H	0.26	0.98

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	232	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.8 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0427	Run Type:	DL	Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	99	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW412

Lab Sample ID: 500-56075-3

Date Sampled: 04/15/2013 1635

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	512.5 mL
Dilution:	5.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0821	Run Type:	REDL	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	114	D	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW633

Lab Sample ID: 500-56075-4

Date Sampled: 04/15/2013 1648

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	530.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1013			Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.19	UJ	0.048	0.19
4-Amino-2,6-dinitrotoluene	<0.19	UJ	0.054	0.19
1,3-Dinitrobenzene	<0.38	UJ	0.084	0.38
2,4-Dinitrotoluene	<0.38	UJ	0.079	0.38
2,6-Dinitrotoluene	<0.19	UJ	0.061	0.19
HMX	0.43	* J, Q	0.083	0.38
m-Nitrotoluene	<0.38	UJ	0.079	0.38
Nitrobenzene	<0.38	* UJ, Q	0.086	0.38
o-Nitrotoluene	<0.38	* UJ, Q	0.081	0.38
p-Nitrotoluene	<0.94	* UJ, Q	0.19	0.94
RDX	1.6	J	0.049	0.19
Tetryl	<0.23	UJ	0.075	0.23
1,3,5-Trinitrobenzene	<0.94	UJ	0.19	0.94
2,4,6-Trinitrotoluene	<0.38	UJ	0.068	0.38

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	60	X	75 - 118

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Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW633

Lab Sample ID: 500-56075-4

Date Sampled: 04/15/2013 1648

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	515.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0048	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.19	H	0.049	0.19
4-Amino-2,6-dinitrotoluene	<0.19	H	0.056	0.19
1,3-Dinitrobenzene	<0.39	H	0.086	0.39
2,4-Dinitrotoluene	<0.39	H	0.081	0.39
2,6-Dinitrotoluene	<0.19	H	0.063	0.19
HMX	0.57	H	0.085	0.39
m-Nitrotoluene	<0.39	H	0.081	0.39
Nitrobenzene	<0.39	H	0.088	0.39
o-Nitrotoluene	<0.39	H	0.083	0.39
p-Nitrotoluene	<0.97	H	0.19	0.97
RDX	2.2	H	0.051	0.19
Tetryl	<0.23	H	0.077	0.23
1,3,5-Trinitrobenzene	<0.97	H	0.19	0.97
2,4,6-Trinitrotoluene	<0.39	H	0.070	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	91		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW633

Lab Sample ID: 500-56075-4

Date Sampled: 04/15/2013 1648

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	530.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0506			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	67	X	75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW633

Lab Sample ID: 500-56075-4

Date Sampled: 04/15/2013 1648

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	515.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0900	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	92		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW996

Lab Sample ID: 500-56075-5

Date Sampled: 04/15/2013 1200

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	477.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1107			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.21		0.053	0.21
4-Amino-2,6-dinitrotoluene	<0.21		0.060	0.21
1,3-Dinitrobenzene	<0.42		0.093	0.42
2,4-Dinitrotoluene	<0.42		0.088	0.42
2,6-Dinitrotoluene	<0.21		0.067	0.21
HMX	0.60	* Q	0.092	0.42
m-Nitrotoluene	<0.42		0.087	0.42
Nitrobenzene	<0.42	* Q	0.095	0.42
o-Nitrotoluene	<0.42	* Q	0.089	0.42
p-Nitrotoluene	<1.0	* Q	0.21	1.0
RDX	2.4		0.055	0.21
Tetryl	<0.25		0.083	0.25
1,3,5-Trinitrobenzene	<1.0		0.21	1.0
2,4,6-Trinitrotoluene	<0.42		0.076	0.42

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		75 - 118

CB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW996

Lab Sample ID: 500-56075-5

Date Sampled: 04/15/2013 1200

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	500.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0115	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	H	0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20	H	0.058	0.20
1,3-Dinitrobenzene	<0.40	H	0.089	0.40
2,4-Dinitrotoluene	<0.40	H	0.084	0.40
2,6-Dinitrotoluene	<0.20	H	0.064	0.20
HMX	0.60	H	0.087	0.40
m-Nitrotoluene	<0.40	H	0.083	0.40
Nitrobenzene	<0.40	H	0.091	0.40
o-Nitrotoluene	<0.40	H	0.085	0.40
p-Nitrotoluene	<1.0	H	0.20	1.0
RDX	2.6	H	0.052	0.20
Tetryl	<0.24	H	0.079	0.24
1,3,5-Trinitrobenzene	<1.0	H	0.20	1.0
2,4,6-Trinitrotoluene	<0.40	H	0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	89		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW996

Lab Sample ID: 500-56075-5

Date Sampled: 04/15/2013 1200

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	477.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0545			Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW996

Lab Sample ID: 500-56075-5

Date Sampled: 04/15/2013 1200

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	500.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 1018	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	91		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW630

Lab Sample ID: 500-56075-6

Date Sampled: 04/16/2013 1052

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1134			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.10	J p	0.049	0.19
4-Amino-2,6-dinitrotoluene	0.17	J p	0.056	0.19
1,3-Dinitrobenzene	<0.39		0.086	0.39
2,4-Dinitrotoluene	<0.39		0.081	0.39
2,6-Dinitrotoluene	<0.19		0.063	0.19
HMX	4.5	* Q	0.085	0.39
m-Nitrotoluene	<0.39		0.081	0.39
Nitrobenzene	<0.39	* Q	0.088	0.39
o-Nitrotoluene	<0.39	* Q	0.083	0.39
p-Nitrotoluene	<0.97	* Q	0.19	0.97
RDX	6.1		0.051	0.19
Tetryl	<0.23		0.077	0.23
1,3,5-Trinitrobenzene	<0.97		0.19	0.97
2,4,6-Trinitrotoluene	<0.39		0.070	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		75 - 118

PS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW630

Lab Sample ID: 500-56075-6

Date Sampled: 04/16/2013 1052

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	509.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0142	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	0.069	J H p	0.050	0.20
4-Amino-2,6-dinitrotoluene	0.089	J H p	0.057	0.20
1,3-Dinitrobenzene	<0.39	H	0.087	0.39
2,4-Dinitrotoluene	<0.39	H	0.082	0.39
2,6-Dinitrotoluene	<0.20	H	0.063	0.20
HMX	4.6	H	0.086	0.39
m-Nitrotoluene	<0.39	H	0.082	0.39
Nitrobenzene	<0.39	H	0.089	0.39
o-Nitrotoluene	<0.39	H	0.084	0.39
p-Nitrotoluene	<0.98	H	0.20	0.98
RDX	6.1	H	0.051	0.20
Tetryl	<0.24	H	0.078	0.24
1,3,5-Trinitrobenzene	<0.98	H	0.20	0.98
2,4,6-Trinitrotoluene	<0.39	H	0.071	0.39
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	93		75 - 118	

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW630

Lab Sample ID: 500-56075-6

Date Sampled: 04/16/2013 1052

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	515.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0624			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW630

Lab Sample ID: 500-56075-6

Date Sampled: 04/16/2013 1052

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171539	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	509.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 1057	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	92		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW631

Lab Sample ID: 500-56075-7

Date Sampled: 04/16/2013 1151

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	519.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1201			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.19		0.049	0.19
4-Amino-2,6-dinitrotoluene	<0.19		0.056	0.19
1,3-Dinitrobenzene	<0.39		0.085	0.39
2,4-Dinitrotoluene	<0.39		0.081	0.39
2,6-Dinitrotoluene	<0.19		0.062	0.19
HMX	<0.39	* Q	0.084	0.39
m-Nitrotoluene	<0.39		0.080	0.39
Nitrobenzene	<0.39	* Q	0.088	0.39
o-Nitrotoluene	<0.39	* Q	0.082	0.39
p-Nitrotoluene	<0.96	* Q	0.19	0.96
RDX	<0.19		0.050	0.19
Tetryl	<0.23		0.076	0.23
1,3,5-Trinitrobenzene	<0.96		0.19	0.96
2,4,6-Trinitrotoluene	<0.39		0.070	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		75 - 118

BS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW631

Lab Sample ID: 500-56075-7

Date Sampled: 04/16/2013 1151

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	504.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0209	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	H	0.050	0.20
4-Amino-2,6-dinitrotoluene	<0.20	H	0.057	0.20
1,3-Dinitrobenzene	<0.40	H	0.088	0.40
2,4-Dinitrotoluene	<0.40	H	0.083	0.40
2,6-Dinitrotoluene	<0.20	H	0.064	0.20
HMX	<0.40	H	0.087	0.40
m-Nitrotoluene	<0.40	H	0.083	0.40
Nitrobenzene	<0.40	H	0.090	0.40
o-Nitrotoluene	<0.40	H	0.085	0.40
p-Nitrotoluene	<0.99	H	0.20	0.99
RDX	<0.20	H	0.052	0.20
Tetryl	<0.24	H	0.079	0.24
1,3,5-Trinitrobenzene	<0.99	H	0.20	0.99
2,4,6-Trinitrotoluene	<0.40	H	0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	84		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW410

Lab Sample ID: 500-56075-9

Date Sampled: 04/16/2013 1252

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	506.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1228			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.050	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.057	0.20
1,3-Dinitrobenzene	<0.39		0.088	0.39
2,4-Dinitrotoluene	<0.39		0.083	0.39
2,6-Dinitrotoluene	<0.20		0.064	0.20
HMX	<0.39	* Q	0.086	0.39
m-Nitrotoluene	<0.39		0.082	0.39
Nitrobenzene	<0.39	* Q	0.090	0.39
o-Nitrotoluene	<0.39	* Q	0.084	0.39
p-Nitrotoluene	<0.99	* Q	0.20	0.99
RDX	<0.20		0.052	0.20
Tetryl	<0.24		0.078	0.24
1,3,5-Trinitrobenzene	<0.99		0.20	0.99
2,4,6-Trinitrotoluene	<0.39		0.071	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	89		75 - 118

OS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-GWMW410

Lab Sample ID: 500-56075-9

Date Sampled: 04/16/2013 1252

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	509.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0236	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	H	0.050	0.20
4-Amino-2,6-dinitrotoluene	<0.20	H	0.057	0.20
1,3-Dinitrobenzene	<0.39	H	0.087	0.39
2,4-Dinitrotoluene	<0.39	H	0.082	0.39
2,6-Dinitrotoluene	<0.20	H	0.063	0.20
HMX	<0.39	H	0.086	0.39
m-Nitrotoluene	<0.39	H	0.082	0.39
Nitrobenzene	<0.39	H	0.089	0.39
o-Nitrotoluene	<0.39	H	0.084	0.39
p-Nitrotoluene	<0.98	H	0.20	0.98
RDX	<0.20	H	0.051	0.20
Tetryl	<0.24	H	0.078	0.24
1,3,5-Trinitrobenzene	<0.98	H	0.20	0.98
2,4,6-Trinitrotoluene	<0.39	H	0.071	0.39

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	84		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-SW558

Lab Sample ID: 500-56075-10

Client Matrix: Water

Date Sampled: 04/16/2013 1020

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	501.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1255			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.088	0.40
2,4-Dinitrotoluene	<0.40		0.084	0.40
2,6-Dinitrotoluene	<0.20		0.064	0.20
HMX	<0.40	* Q	0.087	0.40
m-Nitrotoluene	<0.40		0.083	0.40
Nitrobenzene	<0.40	* Q	0.091	0.40
o-Nitrotoluene	<0.40	* Q	0.085	0.40
p-Nitrotoluene	<1.0	* Q	0.20	1.0
RDX	<0.20		0.052	0.20
Tetryl	<0.24		0.079	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.40		0.072	0.40
Surrogate	%Rec	Qualifier	Acceptance Limits	
1,2-Dinitrobenzene	84		75 - 118	

EB
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-SW558

Lab Sample ID: 500-56075-10

Client Matrix: Water

Date Sampled: 04/16/2013 1020

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171486	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-171350	Initial Weight/Volume:	500.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/27/2013 0303	Run Type:	RE	Injection Volume:	100 µL
Prep Date:	04/25/2013 1708			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20	H	0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20	H	0.058	0.20
1,3-Dinitrobenzene	<0.40	H	0.089	0.40
2,4-Dinitrotoluene	<0.40	H	0.084	0.40
2,6-Dinitrotoluene	<0.20	H	0.064	0.20
HMX	<0.40	H	0.088	0.40
m-Nitrotoluene	<0.40	H	0.083	0.40
Nitrobenzene	<0.40	H	0.091	0.40
o-Nitrotoluene	<0.40	H	0.085	0.40
p-Nitrotoluene	<1.0	H	0.20	1.0
RDX	<0.20	H	0.052	0.20
Tetryl	<0.24	H	0.079	0.24
1,3,5-Trinitrobenzene	<1.0	H	0.20	1.0
2,4,6-Trinitrotoluene	<0.40	H	0.072	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	79		75 - 118

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-SW777

Lab Sample ID: 500-56075-11

Client Matrix: Water

Date Sampled: 04/16/2013 1050

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-171099	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170277	Initial Weight/Volume:	497.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/25/2013 1322			Injection Volume:	100 uL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.20		0.051	0.20
4-Amino-2,6-dinitrotoluene	<0.20		0.058	0.20
1,3-Dinitrobenzene	<0.40		0.089	0.40
2,4-Dinitrotoluene	<0.40		0.084	0.40
2,6-Dinitrotoluene	<0.20		0.065	0.20
HMX	<0.40	* Q	0.088	0.40
m-Nitrotoluene	<0.40		0.084	0.40
Nitrobenzene	<0.40	* Q	0.091	0.40
o-Nitrotoluene	<0.40	* Q	0.086	0.40
p-Nitrotoluene	<1.0	* Q	0.20	1.0
RDX	<0.20		0.053	0.20
Tetryl	<0.24		0.080	0.24
1,3,5-Trinitrobenzene	<1.0		0.20	1.0
2,4,6-Trinitrotoluene	<0.40		0.073	0.40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	89		75 - 118

BS
6-18-13

Analytical Data

Client: Toltest Inc.

Job Number: 500-56075-1

Client Sample ID: JP-L3-SW557

Lab Sample ID: 500-56075-12

Date Sampled: 04/16/2013 1120

Client Matrix: Water

Date Received: 04/16/2013 1530

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-170647	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-170292	Initial Weight/Volume:	292.87 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	04/22/2013 1655			Injection Volume:	100 µL
Prep Date:	04/19/2013 1340			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
2-Amino-4,6-dinitrotoluene	<0.34		0.087	0.34
4-Amino-2,6-dinitrotoluene	<0.34		0.099	0.34
1,3-Dinitrobenzene	<0.68		0.15	0.68
2,4-Dinitrotoluene	<0.68		0.14	0.68
2,6-Dinitrotoluene	<0.34		0.11	0.34
HMX	<0.68		0.15	0.68
m-Nitrotoluene	<0.68		0.14	0.68
Nitrobenzene	<0.68		0.16	0.68
o-Nitrotoluene	<0.68		0.15	0.68
p-Nitrotoluene	<1.7		0.34	1.7
RDX	<0.34		0.089	0.34
Tetryl	<0.41		0.14	0.41
1,3,5-Trinitrobenzene	<1.7		0.34	1.7
2,4,6-Trinitrotoluene	<0.68		0.12	0.68

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	84		75 - 118

B2 - DATA USABILITY REPORT

APPENDIX B2

DATA USABILITY REPORT GROUNDWATER AND SURFACE WATER SAMPLING JANUARY AND APRIL 2013

JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS

Submitted to:



**US Army Contracting Agency
APG Directorate of Contracting – AEC Team
E4460 Beal Road, APG-EA, MD 21010**

Contract Number: W91ZLK-05-D-0012

TolTest Project Number: 22271

Submitted by:



**1480 Ford Street
Maumee, OH 43537
(419) 794-3500**

DATA USABILITY REPORT

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2	Summary of Qualified Results

ACRONYMS AND ABBREVIATIONS

%D	percent difference
%R	percent recovery
CCB	continuing calibration blank
CCV	continuing calibration verification
GC/MS	gas chromatography/mass spectroscopy
ICAL	initial calibration
ICB	initial calibration blank
ICS	interference check sample
ICV	initial calibration verification
J	estimated value
JOAAP	Joliet Army Ammunition Plant
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
LDC	Laboratory Data Consultants
MD	matrix duplicate (metals)
mg/L	milligrams per liter
MRL	method reporting limit
MS/MSD	matrix spike/matrix spike duplicate
MWH	MWH Americas, Inc.
ORP	oxidation/reduction potential
QA	quality assurance
QC	quality control
R	analytical result is unusable
RPD	relative percent difference
SDG	sample delivery group
SVOCs	semivolatile organic compounds
TAL	target analyte list
Test America	Test America Laboratories, Inc.
ug/L	micrograms per liter
U	analyte analyzed for but not detected
UJ	analyte is not detected estimated quantitation limit
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

CRS/crs/RJR/BTZ

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APPENDIX B2

DATA USABILITY REPORT

1.0 INTRODUCTION

The following data usability summary discusses quality assurance/quality control (QA/QC) outliers for each analyte group per sampling round. Data qualifiers were added to results and imported into the Joliet Army Ammunition Plant (JOAAP) database. Data qualifiers used in the validation process may include the following:

- U – Not detected. This validation qualifier was added if there was blank contamination and the sample concentration was less than five times the blank concentration (ten times for common organic contaminants methylene chloride, acetone, and phthalates)
- J – Estimated value. This validation qualifier was added if the reported concentration is estimated.
- UJ – Not detected, estimated quantitation limit. This validation qualifier was added if the analyte was not detected but QA/QC parameters were not met.
- R – Unusable data. This validation qualifier was added if the QA/QC parameters were not met and were extremely low (i.e. less than 10% recovery for laboratory control samples (LCS) or surrogate recoveries)

Test America Laboratories, Inc. (Test America) located at 4955 Yarrow Street, Arvada, Colorado performed the analyses of groundwater and surface water samples collected in January and April 2013 at the JOAAP located in Wilmington, Illinois. Groundwater was collected from site M13 Landfill and analyzed for the following parameters in January 2013:

- Volatile organic compounds (VOCs) were analyzed by SW846 Method 8260B.
- Semivolatile organic compounds (SVOCs) were analyzed by SW846 Method 8270C.
- Explosives were analyzed by SW846 Method 8330.
- Target analyte list (TAL) metals were analyzed by SW846 Methods 6010B and 7470A (mercury).
- Sulfate was analyzed by United States Environmental Protection Agency (USEPA) Method 9056A.
- Nitrate was analyzed by USEPA Method 9056A.

Groundwater was collected from seven sites (L1, L3, M6, M7, M9, M13, and Other Areas) and analyzed for the following parameters in April 2013:

- VOCs were analyzed by SW846 Method 8260B at Site M13 Landfill.
- SVOCs were analyzed by SW846 Method 8270C at Site M13 Landfill.
- Explosives were analyzed by SW846 Method 8330 at Sites L1, L3, OA, M6, M7,

and M13 Landfill.

- TAL metals were analyzed by SW846 Methods 6010B and 7470A at Sites L3 Landfill and M13 Landfill.
- Sulfate was analyzed by USEPA Method 9056A at Sites M9 and M13 Landfill.
- Nitrate was analyzed by USEPA Method 9056A at Site M13 Landfill.

Surface water was collected from three sites at JOAAP and analyzed for the following parameters:

- Explosives were analyzed by SW846 Method 8330 at Site L3 Landfill.
- TAL metals were analyzed by SW846 Methods 6010B and 7470A at Site L3 Landfill.
- Sulfate was analyzed by USEPA Method 9056A at Site M1.

Field parameters are not discussed in this data usability report, but were recorded by field personnel with a water quality meter at the time of sample collection and included:

- pH, temperature, specific conductivity, dissolved oxygen, turbidity, and oxidation/reduction potential (ORP)

The following summarizes the sample delivery group (SDG) and corresponding data quality evaluation report:

Sample Delivery Group	Data Validation Report	Associated Samples
500-54207-1	JOAAP Data Quality Evaluation Report - January 2013 Report 1	JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW808 JP-M13-GWMW809
500-54239-1	JOAAP Data Quality Evaluation Report - January 2013 Report 2	JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW999
500-55877-1	JOAAP Data Evaluation Report - April 2013 Report 1	JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW808 JP-M13-GWMW809 JP-M13-GWMW999
500-55945-1	JOAAP Data Evaluation Report - April 2013 Report 2	JP-M9-GWMW330 JP-OA-GWMW118 JP-OA-GWMW119 JP-OA-GWMW117 JP-M6-GWMW123R JP-M7-GWMW-124R JP-M6-GWMW318

Sample Delivery Group	Data Validation Report	Associated Samples
		JP-M6-GWMW162R JP-M6-GWMW652 JP-M6-GWMW319
500-56026-1	JOAAP Data Evaluation Report - April 2013 Report 3	JP-M9-GWMW998 JP-M6-GWMW212R JP-M6-GWMW313 JP-M6-GWMW654 JP-M1-GWMW649 JP-M1-GWMW-107 JP-M1-SW709 JP-M1-GWMW643 JP-M1-GWMW644 JP-M1-GWMW648 JP-M1-GWMW645 JP-M1-GWMW646 JP-M01-GWMW231
500-56039-1	JOAAP Data Evaluation Report - April 2013 Report 4	JP-M1-GWMW641 JP-M1-GWMW997 JP-L1-GWMW173 JP-L1-GWMW999 JP-L1-GWMW174 JP-L1-GWWES1 JP-L1-GWWES3 JP-L1-GWMW131 JP-L1-SW550
500-56075-1	JOAAP Data Evaluation Report - April 2013 Report 5	JP-M1-GWMW640 JP-M1-GWMW642 JP-L3-SW004 JP-L3-GWMW631 JP-L3-GWMW630 JP-L3-GWMW996 JP-L3-GWMW996 JP-L3-SW557 JP-L3-SW558 JP-L3-SW777 JP-L3-GWMW633 JP-L3-GWMW410 JP-L3-GWMW412

2.0 LABORATORY QA/QC ELEMENTS

Toltest, Inc. (Toltest) performed the equivalent of USEPA Level III validation on 100% of the data using the JOAAP Quality Assurance Project Plan (QAPP) for Long Term Monitoring, a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, and the Department of Defense Quality Systems Manual for Environmental Laboratories validation guidelines, as appropriate. QAPP Worksheets # 34, #35, and #36 describe the verification process and QAPP Worksheet #37 describes the data usability assessment.

Data were evaluated for precision, accuracy, representativeness, comparability, and completeness based on results of the following QA/QC samples and parameters, where applicable:

- Sample preservation
- Sample holding times
- Surrogate spikes (organics)
- Laboratory control sample (LCS/LCSD)
- Matrix spike/matrix spike duplicate (MS/MSD)
- Matrix duplicate (MD) for metals
- Laboratory duplicate samples
- Gas chromatography/mass spectroscopy (GC/MS) tunes (organics)
- Internal standards (organics)
- Initial calibration (ICAL) standards
- Initial calibration verification (ICV) standards
- Continuing calibration verification (CCV) standards
- Interference check samples (ICSs) (metals)
- Trip blanks (VOCs)
- Serial dilution (metals)
- Method blanks
- Initial calibration blanks (ICBs)
- Continuing calibration blanks (CCBs)

The following field QA/QC samples were collected and analyzed:

- One field duplicate per 10 field samples collected
- One MS/MSD (extra sample volume) per 20 field samples collected (not in January 2013)
- Trip blanks included with each cooler containing VOC samples (not in January 2013)

Samples were stored in coolers on wet ice, picked-up from JOAAP by Test America and transported to their University Park, Illinois lab, then shipped to the analytical laboratory in Arvada, Colorado under chain-of-custody documentation.

3.0 EVALUATION OF MEASUREMENT QUALITY OBJECTIVES

For each analytical method, laboratory QA/QC results were compared to the established acceptance limits. Refer to the associated Data Quality Evaluation Reports presented in Appendix B1 for analysis of the below criteria for each individual SDG and associated samples. The parameters reviewed by method within each Data Quality Evaluation Report for each SDG each are outlined as follows.

Precision was quantitatively evaluated by reviewing the relative percent differences (RPDs) for the following QA/QC samples:

- MS/MSDs
- Matrix duplicate (metals)
- LCS/LCSDs
- Laboratory duplicate samples
- Serial dilution (metals)
- Field duplicate samples

Accuracy was quantitatively evaluated by comparing the percent recovery (%R) or percent difference (%D) for the following QA/QC samples or parameters:

- Surrogate spikes (VOCs and SVOCs)
- Internal standards (VOCs and SVOCs)
- ICVs
- CCVs
- MS/MSDs
- LCSs
- ICSs (metals)

Refer to Worksheet #12 (Method Performance Criteria Table) and Worksheet #28 (QC Samples Table) for QC samples analyzed and criteria limits.

Representativeness was evaluated through a review of the following QA/QC elements:

- Sample preservation
- Sample holding times
- Compliance with sample collection, handling, and analysis methods specified in the Work Plan

Refer to QAPP Worksheets # 21 through # 27 for evaluation criteria related to representativeness.

Comparability was qualitatively evaluated through a review of the following QA/QC elements:

- Sample collection and handling procedures

- Sample preparation, analysis, and quantitation procedures
- Units of measure

Refer to QAPP Worksheets # 21 through # 27 for evaluation criteria related to comparability. Comparability was acceptable for the January and April 2013 sampling events.

The following samples, presented in Table 1, were rejected as a result of not meeting one or more of the above criteria as presented in the Data Quality Evaluation Reports in Appendix B1.

3.1 COMPLETENESS

Completeness was calculated by dividing the number of acceptable sample results by the total number of scheduled sample results. All scheduled and planned samples were collected and analyzed. The completeness goal for holding times was 100%. Completeness goals for holding times were met for all analytes in the January and April 2013 sampling rounds. It should be noted that the re-analysis of two samples for SDG 500-55877 were outside of the hold time requirement. As a result, the results are considered valid but all detections will be considered estimated and flagged with “J”.

The laboratory completeness goal for the number of acceptable sample results compared to the total sample results is 99.7%. Only results qualified “R” as unusable were considered unacceptable sample results for calculating laboratory completeness. Sample results qualified “J” as estimated, “U” as not detected, or “UJ” as not detected estimated quantitation limit were considered quantitative and acceptable.

No analytes were qualified “R” as unusable for the January and April 2013 sampling rounds with the exception of those listed in Table 1 of this Appendix. Completeness and usability was 99.8% and 99.6% for January and April 2013, respectively.

Refer to QAPP Worksheet #37 for the data usability criteria.

3.2 SENSITIVITY

Sensitivity was evaluated by comparing method reporting limits (MRLs) with appropriate criteria. In samples not requiring dilutions, adequate sensitivity was demonstrated with MRLs equal to or less than the associated criteria with the exception of 2,4-Dinitrotoluene for samples JP-M13-GWMW806 and JP-M13-GWMW809 associated with SDG 500-55877-1. The MRL for samples JP-M13-GWMW806 and JP-M13-GWMW809 were greater than the RG (0.42 ug/L) and the MRL was 0.45 ug/L for sample M13-MW806 and 0.43 ug/L for sample M13-MW809. In addition, the MRL for 2,4-Dinitrotoluene at SW004 and SW557 were greater than the RG. Site decisions were not impacted or affected by the elevated MRLs.

The MRL for cadmium and silver were above their remedial goals (RGs) at surface water sampling point SW777. However, the project objectives were not affected by the elevated MRLs as there have not been previous exceedances detected for cadmium and silver at surface water sampling location SW777.

Refer to QAPP Worksheet #15 the Reference Limits and Evaluation Table for compound specific MRLs, method detection limits, and project action limits.

3.3 TRACEABILITY

Traceability was evaluated by reviewing field documentation, chain-of-custody documentation, and analytical reports. Each sample was found to be traceable from collection through analysis.

3.4 DATA QUALIFIERS

Refer to Tables 3-1 through 3-5 of the 2013 Semi-annual Groundwater Monitoring Report for summaries of groundwater and surface water data. Refer to Appendix B1 for data evaluation reports associated with each SDG. Table 2 of Appendix B2 provides a summary of all qualified data.

3.5 CONCLUSIONS

As discussed in Section 3.1, completeness goals were met for the January and April 2013 analytical data. The data complies with contract requirements. The estimated data qualified “J” or “UJ” and blank qualified data qualified “U” which does not meet QA criteria are considered usable and do not negatively impact the project objectives. There were no biases or trends observed in this dataset.

4.0 REFERENCES

- DoD, 2006. *Quality Systems Manual for Environmental Laboratories, Final Version 3*, DoD Environmental Data Quality Workgroup. January 2006.
- MWH, 2010. *Final Quality Assurance Project Plan (QAPP) JOAAP Environmental Remediation*, MWH America's Inc. (MWH), March 2010.
- USEPA, 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods Third Edition*. November 1986.
- USEPA, 2008. *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. June 2008.
- USEPA, 2010. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*. January 2010.

**APPENDIX B2
TABLE 1**

**Summary of "R" Qualified Results
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

January 2013 Samples

Analysis	Failed Criteria	Date	Compound	%D or %R	Associated Samples	SDG
VOCs	ICV	1/23/2013	Vinyl acetate	26.3%	JP-M13-GWMW808 JP-M13-GWMW809	500-54207-1

April 2013 Samples

VOCs	ICV	4/11/2013	Methyl tert-butyl ether	48.0%	JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW808 JP-M13-GWMW809 JP-M13-GWMW999	500-55877-1
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APPENDIX B2

TABLE 2

Summary of Qualified Results 2013 Semi-annual Groundwater Monitoring Report Joliet Army Ammunition Plant Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
January 2013							
VOCs	ICV	1/23/2013	Vinyl acetate	26.3%	JP-M13-GWMW808 JP-M13-GWMW809	500-54207-1	R
VOCs	CCV	2/6/2013	Trichlorofluoromethane 2,2-dichloropropane Carbon tetrachloride 2-hexanone naphthalene	23.60% 34.90% 34.00% 29.90% 24.80%	JP-M13-GWMW809 JP-M13-GWMW808	500-54207-1	J (all detects) UJ (all non-detects)
VOCs	CCV	2/7/2013	benzoic acid	27.80%	JP-M13-GWMW808 JP-M13-GWMW809 JP-M13 GWMW126R JP-M13-GWMW362	500-54207-1	J (all detects) UJ (all non-detects)
Metals	Blanks	2/4/2013	Thallium	0.00603 mg/L	JP-M13-GWMW808 (0.0087 mg/L) JP-M13-GWMW809 (0.0065 mg/L) JP-M13-GW126R (0.012 mg/L) JP-M13-GWMW362 (0.012 mg/L)	500-54207-1	B
Explosives	Surrogate Spike	2/4/2013	1,2-Dinitrotoluene	73.00%	JP-M13-GWMW362	500-54207-1	J for detects and UJ for non-detects
Explosives	RPD	2/4/2013	2,6-Dinitrotoluene	56.50%	JP-M13-GWMW362	500-54207-1	J
January 2013							
VOCs	CCV	2/6/2013	Acetone 2-butanone 4-methyl-2-pentanone 2-hexanone Vinyl acetate	22.40% 44.00% 31.10% 21.70% 22.30%	JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW999	500-54239-1	J (all detects) UJ (all non-detects)
SVOCs	CCV	2/12/2013	benzoic acid	24.90%	JP-M13-GWMW806 JP-M13-GWMW807 JP-M13 GWMW999	500-54239-1	UJ (all non-detects)
Metals	Blanks	2/18/2013	Manganese	0.000770 mg/L	JP-M13-GWMW806 (0.0069 mg/L) JP-M13-GWMW807 (0.13 mg/L) JP-M13-GWMW999 (0.0069 mg/L)	500-54239-1	B
April 2013							
VOCs	ICV	4/11/2013	Methyl tert-butyl ether	48.0%	JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW808 JP-M13-GWMW809 JP-M13-GWMW999	500-55877-1	R
VOCs	CCV	4/11/2013	Dichlorodifluoromethane	38.50%	JP-M13-GWMW126R JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW809 JP-M13-GWMW808	500-55877-1	Q
VOCs	CCV	4/11/2013	Dichlorodifluoromethane	38.10%	JP-M13-GWMW362 JP-M13-GWMW999	500-55877-1	Q

APPENDIX B2

TABLE 2

**Summary of Qualified Results
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
VOCs	CCV	4/11/2013	Isopropylbenzene n-propylbenzene 1,3,5- trimethylbenzene n-butylbenzene	24.50% 21.00% 22.00% 23.80%	JP-M13-GWMW362 JP-M13-GWMW999	500-55877-1	J (all detects) UJ (all non-
VOCs	LCS	4/11/2013	Acetone	162.00%	JP-M13-GWMW126R JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW808 JP-M13-GWMW809	500-55877-1	Q
Explosives	Surrogate Spike	4/12/2013	1,2-Dinitrobenzene	74% 63% 66% 64%	JP-M13-GWMW362 JP-M13-GWMW126R JP-M13-GWMW807 JP-M13-GWMW808	500-55877-1	J for detects and UJ for non-detects
Explosives	RPD	4/12/2013	2,6-dinitrotoluene 4-amino-2,6-DNT 2-amino-4,6-DNT	46.20% 52.00% 40.80%	JP-M13-GWMW362	500-55877-1	J
Explosives	RPD	4/12/2013	4-amino-2,6-DNT 2,6-dinitrotoluene	55.80% 45.30%	JP-M13-GWMW999	500-55877-1	J
April 2013							
Explosives	Surrogate Spike	4/15/2013	1,2-Dinitrobenzene	37%	JP-M7-GWMW124R	500-55945-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/16/2013	1,2-Dinitrobenzene	173%	JP-M6-GWMW319	500-55945-1	HMX J
Explosives	Surrogate Spike	4/15/2013	1,2-Dinitrobenzene	23%	JP-M6-GWMW652	500-55945-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/18/2013	1,2-Dinitrobenzene	339%	JP-M6-GWMW318	500-55945-1	J for detects and UJ for non-detects
Explosives	RPD	4/18/2013	1,3,5-trinitrobenzene, 2,6-dinitrotoluene	78.70% 156.70%	JP-M6-GWMW318 undiluted	500-55945-1	J
Explosives	RPD	4/19/2013	HMX	128.00%	JP-M6-GWMW318 diluted	500-55945-1	J
Explosives	RPD	4/15/2013	RDX 1,3-dinitrobenzene nitrobenzene 4-amino-2,6-dinitrotoluene p-nitrotoluene	197.70% 54% 55.30% 51.90% 43.20%	JP-M6-GWMW652	500-55945-1	
Explosives	RPD	4/16/2013	HMX	56.90%	JP-M6-GWMW319	500-55945-1	J

APPENDIX B2

TABLE 2

Summary of Qualified Results 2013 Semi-annual Groundwater Monitoring Report Joliet Army Ammunition Plant Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
April 2013							
Explosives	Surrogate Spike	4/17/2013	1,2-Dinitrobenzene	0%	JP-M6-GWMW998	500-56026-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/17/2013	1,2-Dinitrobenzene	0%	JP-M6-GWMW212R	500-56026-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/17/2013	1,2-Dinitrobenzene	148%	JP-M6-GWMW654	500-56026-1	J for detects and UJ for non-detects
Explosives	RPD	4/17/2013	RDX 1,3,5-trinitrobenzene 1,3-dinitrobenzene nitrobenzene	199.80% 176.50% 163.30% 120.90%	JP-M6-GWMW998 undiluted	500-56026-1	J
Explosives	RPD	4/18/2013	2-amino-4,6-dinitrotoluene	62.00%	JP-M6-GWMW998 diluted	500-56026-1	J
Explosives	RPD	4/17/2013	RDX, 1,3,5-trinitrobenzene 1,3-dinitrobenzene nitrobenzene	199.80% 183.40% 66.40% 100.90%	JP-M6-GWMW212R undiluted	500-56026-1	J
Explosives	RPD	4/18/2013	2-amino-4,6-dinitrotoluene	41.70%	JP-M6-GWMW212R diluted	500-56026-1	J
Explosives	RPD	4/17/2013	RDX	189.60%	JP-M6-GWMW313	500-56026-1	J
Explosives	RPD	4/17/2013	RDX 1,3,5-trinitrobenzene 4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2,6-dinitrotoluene 2,4-dinitrotoluene	195.00% 76.00% 79.60% 93.70% 51.70% 41.30%	JP-M6-GWMW654	500-56026-1	J
April 2013							
Explosives	Surrogate Spike	4/18/2013	1,2-Dinitrobenzene	0%	JP-L01-GWMW131	500-56039-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/19/2013	1,2-Dinitrobenzene	144%	JP-L01-GWMWES3	500-56039-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/18/2013	1,2-Dinitrobenzene	8031%	JP-L01-GWMWES1	500-56039-1	J for detects and UJ for non-detects

**APPENDIX B2
TABLE 2**

**Summary of Qualified Results
2013 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois**

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
Explosives	RPD	4/18/2013	HMX RDX 4-amino-2,6-dinitrotoluene	195.20% 80.00% 66.60%	JP-L01-GWMW173 undiluted	500-56039-1	J
Explosives	RPD	4/18/2013	HMX RDX 4-amino-2,6-dinitrotoluene	195.40% 76.10% 67.00%	JP-L01-GWMW999 undiluted	500-56039-1	J
Explosives	RPD	4/18/2013	2,6-dinitrobenzene nitrobenzene	188.80% 196.80%	JP-L01-GWMWES1 undiluted	500-56039-1	J
April 2013							
Explosives	Surrogate Spike	4/25/2013	1,2-Dinitrobenzene	242%	JP-L3-GWMW412	500-56075-1	J for detects and UJ for non-detects
Explosives	Surrogate Spike	4/25/2013	1,2-Dinitrobenzene	60%	JP-L3-GWMW633	500-56075-1	J for detects and UJ for non-detects
Explosives	MS/MSD	4/25/2013	2-Amino-4,6 dinitrotoluene 4-amino-2,6 dinitrotoluene 2,4-DNT 2,6-DNT HMX m-nitrotoluene nitrobenzene o-nitrotoluene p-nitrotoluene RDX 1,3,5-trinitrobenzene	41% 42% 56% 58% 159% 48% 35% 30% 33% 777% 51%	JP-L3-GWMW412	500-56075-1	J
Explosives	MSD	4/25/2013	tetryl	35%	JP-L3-GWMW412	500-56075-1	J
Explosives	LCS	4/25/2013	HMX nitrobenzene o-nitrotoluene p-nitrotoluene	79% 44% 41% 44%	JP-L3-GWMW412 JP-L3-GWMW633 JP- L3-GWMW630 JP- L3-GWMW996 JP- L3-GWMW631 JP-L3-GWMW410 JP-L3-SW558 JP-L3-SW777	500-56075-1	Q
Explosives	RPD	4/25/2013	4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	72.40% 48.10%	JP-L3-GWMW412 undiluted	500-56075-1	J
Explosives	RPD	4/25/2013	4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	108.00% 41.10%	JP-L3-GWMW630 undiluted	500-56075-1	J

Notes:

B = analyte detected in method blank
CCV = continuing calibration verification
DNT = dinitrotoluene
HMX = high melting explosive
ICV = initial calibration verification
J = estimated concentration
LCS = laboratory control sample
mg/L = miligrams per liter

MS/MSD = matrix spike / matrix spike duplicate
MSD = matrix spike duplicate
Q = LCS recovery lower than quality control limits
R = sample result rejected based on laboratory evaluation criteria
RDX = royal demolition explosive
RPD = relative percent difference
SDG = sample delivery group
SVOCs = semi-volatile organic compounds
U = not detected
UJ = not detected, estimated detection limit
VOCs = volatile organic compounds